EM-SPRINT-NEXTEL-164-130201
440 Hayden Station Road
Windsor

Alcatel·Lucent

1 Robbins Road
Westford, MA 01886

July 9, 2014

State of Connecticut
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Notification of Construction Completion on telecommunication facilities

To whom it may concern:

Alcatel Lucent hereby acknowledges that the list of attached sites have completed construction per the approval granted on the specified date. Please advise if further information is needed..

Very truly yours,

Martha Powers

Martha Powers
Lead Development Manager
Alcatel-Lucent
Sprint Vision Project
1 Robbins Road
Westford, MA 01886

Cc: FST, Siterra

EM/TS #	Address	Town	Sprint ID	Decision Date
EM-SPRINT-062-130912	1065 Wintergreen Avenue	Hamden	CT03XC003	10/15/2013
EM-SPRINT-NEXTEL-060-130118	10 Tanner Marsh Road	Guilford	CT03XC022	2/14/2013
EM-SPRINT-004-130822	181 Montevideo Road	Avon	CT03XC053	9/6/2013
EM-SPRINT-NEXTEL-155-130214A	1358 New Britain Ave.	West Hartford	CT03XC057	3/1/2013
EM-SPRINT-NEXTEL-164-130201	440 Hayden Station Road	Windsor	CT03XC065	3/8/2013
EM-SPRINT-NEXTEL-132-130201	59 McGuire Road	South Windsor	CT03XC066	3/1/2013
EM-SPRINT-NEXTEL-054-130201	299 Paxton Way	Glastonbury	CT03XC081	3/1/2013
EM-SPRINT-NEXTEL-094-130214E	36 Prospect Street	Newington	CT03XC084	3/1/2013
EM-SPRINT-110-130725	10 Sparks Street	Plainville	CT03XC086	8/8/2013
EM-SPRINT-007-130314	260 Beckley Road	Kensington	CT03XC088	4/5/2013
EM-SPRINT-NEXTEL-155-130201	570 New Park Avenue	West Hartford	CT03XC091	3/1/2013
EM-SPRINT-NEXTEL-106-130201	430 Middlesex Turnpike	Old Saybrook	CT03XC102	3/1/2013
EM-SPRINT-NEXTEL-105-130201	30 Short Hills Road	Old Lyme	CT03XC104	3/1/2013
EM-SPRINT-NEXTEL-152-130201	41 Manitock Hill Road	Waterford	CT03XC105	3/1/2013
EM-SPRINT-NEXTEL-045-130201	93 Roxbury Road	East Lyme	CT03XC110	3/1/2013
EM-SPRINT-152-130114	45R Fargo Road	Waterford	CT03XC112	2/14/2013
EM-SPRINT-NEXTEL-027-130201	48 Cow Hill Road	Clinton	CT03XC156	3/1/2013
EM-SPRINT-NEXTEL-082-130201	238 Meridan Road	Middlefield	CT03XC160	3/8/2013
EM-SPRINT-047-130109	160 Plantation Road	East Windsor	CT03XC202	2/7/2013
EM-SPRINT-NEXTEL-077-130214	53 Slater Street	Manchester	CT03XC211	3/1/2013
EM-SPRINT-142-130109	497 Old Post Road	Tolland	CT03XC212	2/7/2013
EM-SPRINT-NEXTEL-042-130222	94 East High Street	East Hampton	CT03XC335	3/8/2013
EM-SPRINT-057-121226	Butternut Hollow Road	Greenwich	CT03XC343	1/11/2013
EM-SPRINT-158-130213	515 Boston Post Road	Westport	CT03XC355	3/1/2013
EM-SPRINT-046-130402	206 Everett Road	Easton	CT03XC362	4/19/2013
EM-SPRINT-085-130322	474 MAIN STREET	MONROE	CT03XC365	4/5/2013
EM-SPRINT-086-131011	57 Cook Drive	Montville	CT03XC365	10/25/2013
EM-SPRINT-118-130322	76 EAST RIDGE	RIDGEFIELD	CT03XC370	4/5/2013
EM-SPRINT-097-131230	20 Barnabas Road	Newtown	CT03XC383	1/21/2014
EM-SPRINT-051-130207	3965 Congress Street	Fairfield	CT03XC385	3/1/2013
EM-SPRINT-NEXTEL-094-130214A	123 Costello Road	Newington	CT23XC555	3/1/2013
EM-SPRINT-119-131008	699 Old Main Street	Rocky Hill	CT23XC556	10/25/2013
EM-SPRINT-077-131008	60 Adams Street	Manchester	CT23XC557	10/25/2013
EM-SPRINT-NEXTEL-080-130123	462 West Main Street	Meriden	CT25XC840	2/14/2013
EM-SPRINT-096-130920	18 Hilltop View Lane	New Milford	CT33XC095	10/4/2013
EM-SPRINT-157-130213	237 Godfrey Road	Weston	CT33XC522	3/1/2013
EM-SPRINT-018-131008	20 Vale Road	Brookfield	CT33XC525	10/25/2013
EM-SPRINT-077-130528	595 Keeney Street	Manchester	CT33XC538	6/14/2013
EM-SPRINT-NEXTEL-129-130214	400 Main Street	Somers	CT33XC554	3/1/2013
EM-SPRINT-047-130322	15 CHAMBERLAIN	BROADBROOK	CT33XC565	4/5/2013
EM-SPRINT-004-130502	277 Huckleberry Road	Avon	CT33XC589	5/17/2013

EM-SPRINT-143-130604	218 Wheeler Road	Torrington	CT33XC592	6/28/2013
EM-SPRINT-140-130724	583 Chapel Street	Thomaston	CT33XC603	8/8/2013
EM-SPRINT-103-130920	Charles Marshall Drive	Norwalk	CT33XC802	10/4/2013
EM-SPRINT-NEXTEL-064-130214	439-455 Homestead Ave.	Hartford	CT43XC805	3/1/2013
EM-SPRINT-064-130311	99 Meadow Street	Hartford	CT43XC806	4/5/2013
EM-SPRINT-083-131127	290 Preston Ave.	Middletown	CT43XC816	12/16/2013
EM-SPRINT-128-130920	530 Bushy Hill Road	Simsbury	CT43XC825	10/4/2013
EM-SPRINT-164-130405A	340 Bloomfield Avenue	Windsor	CT43XC826	4/19/2013
EM-SPRINT-077-130109	239 Middle Turnpike	Manchester	CT43XC827	2/13/2013
EM-SPRINT-165-130118	2-4 Volunteer Drive	Windsor Locks	CT43XC828	2/14/2013
EM-SPRINT-NEXTEL-139-130214	44 Fyler Place	Suffield	CT43XC829	3/8/2013
EM-SPRINT-111-130712	171 Town Hill Road	Plymouth	CT54XC712	7/26/2013
EM-SPRINT-009-130322	38 Spring Hill Road	Bethel	CT54XC749	4/5/2013
EM-SPRINT-154-131011	315 Spencer Plains Road	Westbrook	CT54XC758	10/25/2013
EM-SPRINT-023-130405	14 Canton Springs Road	Canton	CT54XC760	4/19/2013
EM-SPRINT-104-130606	153 Old Salem Road	Norwich	CT54XC775	6/28/2013
EM-SPRINT-164-130405B	99 Day Hill Road	Windsor	CT54XC787	4/19/2013
EM-SPRINT-132-130920	300 Governor's Highway	South Windsor	CT60XC014	10/4/2013
EM-SPRINT-094-130108	605 Willard Avenue	Newington	CT60XC018	1/25/2013
EM-SPRINT-146-130506	197 South Street	Vernon	CT60XC935	5/24/2013
EM-SPRINT-146-130311	777 Talcottville Road	Vernon	CT70XC147	4/5/2013
EM-SPRINT-126-130531	62 Birdseye Road	Shelton	CT73XC004	6/21/2013

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

March 8, 2013

Kevin Savage
Crown Castle
3530 Torrington Way, Suite 300
Charlotte, NC 28277

RE: **EM-SPRINT-NEXTEL-164-130201** - Sprint Nextel Corporation notice of intent to modify an existing telecommunications facility located at 440 Hayden Station Road, Windsor, Connecticut.

Dear Mr. Savage:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated January 29, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding

the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Donald Trinks, Mayor, Town of Windsor
Eric Barz, Town Planner, Town of Windsor

Crown Castle
3530 Torrington Way Suite 300
Charlotte NC 28277

Tel 704-405-6560
Fax 724-416-4911
www.crowncastle.com

ORIGINAL

January 29, 2013

RECEIVED
FEB - 1 2013
CONNECTICUT
SITING COUNCIL

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

RE: Sprint Nextel-Exempt Modification Request- Crown Site BU 876326 Sprint Nextel Site CT03XC065 – Located at – 440 Hayden Station Road Windsor, CT 06095.

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of Sprint Nextel (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their network vision technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Town Manager Peter Souza for the Town of Windsor.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at 440 Hayden Station Road Windsor, CT 06095. Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprints operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for the R.C.S.A. Section 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Sprints replacement antennas and will be located at the same elevation on the existing tower.
2. Although the proposed modifications will involve replacing the ground-mounted equipment the proposed change will not require the extension of the site boundaries.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted a safely standard. A cumulative General Power Density table for Sprint modified facility is included behind Tab 2.

Also attached is a Structural Report confirming that the tower and foundation can support Sprints proposed modifications. (See Tab 3).

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b) (2).

Sincerely,

Kevin Savage

Enclosures
Copy to: Town of Windsor, Town Manager Peter Souza

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT03XC065

Hayden Station
440 Hayden Station Road
Windsor, CT 06095

December 9, 2012

21 B Street Burlington, MA 01803 Tel: (781) 273.2500 Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

December 9, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT03XC065 – Hayden Station**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 440 Hayden Station Road, Windsor, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 440 Hayden Station Road, Windsor, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 3 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **83 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

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Summary

All calculations performed for this analysis yielded results that were above the allowable limits for general public exposure to RF Emissions. However, the area surrounding the tower is a controlled fenced compound, occupational threshold limits would apply to this area.

The anticipated Maximum Composite contributions from the Sprint facility are **50.355% (16.785% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level. This is equal to **10.071% (3.357% from each sector)** of the allowable FCC established occupational limit considering all three sectors simultaneously sampled at the ground level

The anticipated composite MPE value for this site assuming all carriers present is **116.805%** of the allowable FCC established general public limit sampled at the ground level. This is equal to **23.361%** of the allowable FCC established occupational limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. Although values could potentially exceed the FCC established general public limit at the base of the tower, this area is well within the FCC established occupational limit for this same area and should be considered in compliance since it is a controlled area.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

21 B Street Burlington, MA 01803 Tel: (781) 273.2500 Fax: (781) 273.3311

Date: **October 26, 2012**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate – Interim Load**	
	Carrier Site Number:	CT03XC065
	Carrier Site Name:	CT03XC065
Crown Castle Designation:	**Crown Castle BU Number:**	876326
	Crown Castle Site Name:	HAYDEN STATION
	Crown Castle JDE Job Number:	190521
	Crown Castle Work Order Number:	540553
	Crown Castle Application Number:	165358 Rev. 2
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	12-04546E S2
Site Data:	**440 Hayden Station Road, WINDSOR, Hartford County, CT** **Latitude *41° 53' 52.2"*, Longitude *-72° 38' 38.7"*** **96 Foot - Monopole Tower**	

Dear Veronica Harris,

FDH Engineering, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 497464, in accordance with application 165358, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

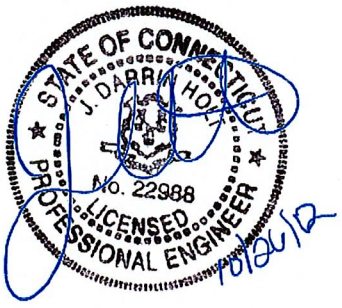
We at *FDH Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Jeff Theberge, EI
Project Engineer

Reviewed by:

J. Darrin Holt, Ph. D., PE
Principal
CT PE License No. 22988



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1) INTRODUCTION

This tower is an 85 ft Monopole tower designed by ROHN in January of 1997. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F. This analysis assumes an 11-ft extension has been added to the original 85 ft tower as proposed by URS Greiner Woodward-Clyde, Inc. project F3000001824.14 dated November 12, 1999.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
83.0	83.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1 1/4	-
81.0	81.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	crown mounts	Side Arm Mount [SO 102-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
92.0	92.0	6	ericsson	RRUS-11	1 2	3/8 3/4	2
		3	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	crown mounts	Side Arm Mount [SO 102-3]			
		3	powerwave technologies	7770.00 w/ Mount Pipe	6	1 5/8	1
		6	powerwave technologies	LGP21401			
		1	crown mounts	T-Arm Mount [TA 601-1]			
83.0	86.0	3	dragonwave	A ANT-11G-4-C	-	-	3
		3	dragonwave	HORIZON DUO			
	83.0	1	crown mounts	Platform Mount [LP 404-1]	6 3 6	1 5/8 1/2 5/16	1
		6	dapa	58000 w/ Mount Pipe			
	82.0	3	kathrein	840 10045 w/ Mount Pipe	-	-	3
		3	samsung telecommunications	WiMAX DAP HEAD			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
75.0	75.0	3	andrew	ONEBASE TWIN DUAL DUPLEX TMA	18	7/8	1
		3	ems wireless	DR65-18-00DPL2Q w/ Mount Pipe			
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
		1	crown mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Existing Equipment, Carrier #2

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
85	85	12	swedcom	ALP9212	12	1 5/8
75	75	12	swedcom	ALP9212	12	1 5/8
60	60	12	swedcom	ALP9212	12	1 5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbor, & Associates LLP (CHA Project No. 5835.07.04) dated August 27, 1996	1530918	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, Inc. (Eng. File No. 34738SW) dated December 23, 1996	1640630	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, Inc. (Eng. File No. 34738SW) dated January 10, 1997	1639483	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	URS Greiner Woodward-Clyde, Inc. (Site CT-140) dated November 12, 1999	1771083	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	96 - 85	Pole	P12x.5	1	-2.31	538.65	16.6	Pass
L2	85 - 65	Pole	P42x3/8	2	-10.72	1484.55	18.5	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-17.73	1643.28	44.5	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-26.87	2356.76	57.2	Pass
							Summary	
						Pole (L4)	57.2	Pass
						RATING =	**57.2**	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	58.3	Pass
1	Base Plate	0	57.5	Pass
1	Base Foundation	0	40.5	Pass
1	Base Foundation Soil Interaction	0	18.5	Pass

Structure Rating (max from all components) =	58.3%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

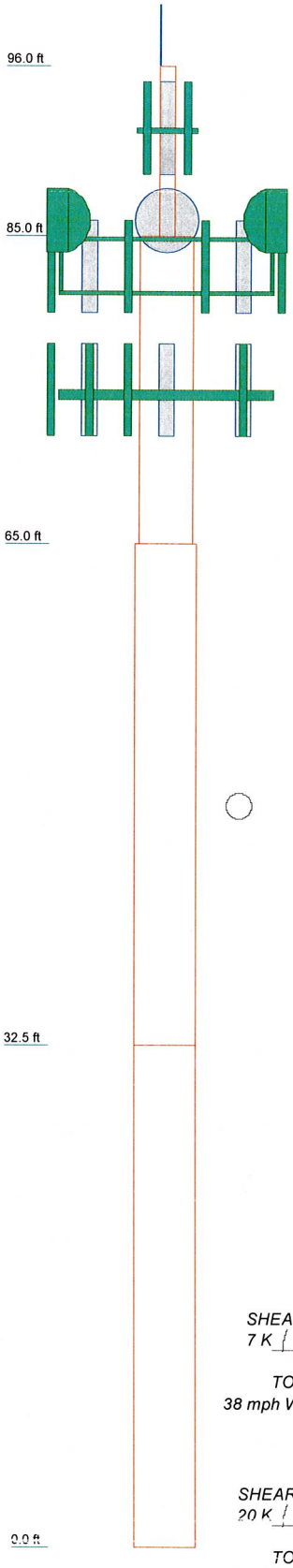
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P12x.5	11.00	A53-B-35	0.7
2	P42x3/8	20.00		3.3
3	P48x3/8	32.50	A53-B-42	6.2
4	P48x1/2	32.50		8.3
				18.5



DESIGNED APPURTENANCE LOADING

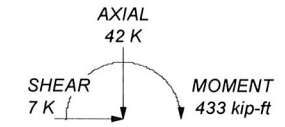
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1/2"x4'	96	APXVSPP18-C-A20 w/ Mount Pipe	83
(2) LGP21401	92	APXVSPP18-C-A20 w/ Mount Pipe	83
(2) LGP21401	92	Platform Mount [LP 404-1]	83
(2) LGP21401	92	(2) 58000 w/ Mount Pipe	83
(2) RRUS-11	92	A-ANT-11G-4-C	83
P65-17-XLH-RR w/ Mount Pipe	92	A-ANT-11G-4-C	83
DC6-48-60-18-8F	92	A-ANT-11G-4-C	83
7770.00 w/ Mount Pipe	92	800MHz 2X50W RRH W/FILTER	81
(2) RRUS-11	92	PCS 1900MHz 4x45W-65MHz	81
P65-17-XLH-RR w/ Mount Pipe	92	Side Arm Mount [SO 102-3]	81
7770.00 w/ Mount Pipe	92	800MHz 2X50W RRH W/FILTER	81
(2) RRUS-11	92	800MHz 2X50W RRH W/FILTER	81
P65-17-XLH-RR w/ Mount Pipe	92	PCS 1900MHz 4x45W-65MHz	81
T-Arm Mount [TA 601-1]	92	PCS 1900MHz 4x45W-65MHz	81
Side Arm Mount [SO 102-3]	92	DR65-18-00DPL2Q w/ Mount Pipe	75
7770.00 w/ Mount Pipe	92	ONEBASE TWIN DUAL DUPLEX TMA	75
HORIZON DUO	83	ONEBASE TWIN DUAL DUPLEX TMA	75
840 10045 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
WIMAX DAP HEAD	83		
(2) 58000 w/ Mount Pipe	83	DR65-18-00DPL2Q w/ Mount Pipe	75
HORIZON DUO	83	Platform Mount [LP 303-1]	75
840 10045 w/ Mount Pipe	83	DR65-18-00DPL2Q w/ Mount Pipe	75
WIMAX DAP HEAD	83	ONEBASE TWIN DUAL DUPLEX TMA	75
(2) 58000 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
HORIZON DUO	83		
840 10045 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
WIMAX DAP HEAD	83		
APXVSPP18-C-A20 w/ Mount Pipe	83		

MATERIAL STRENGTH

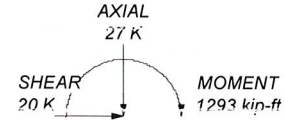
GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 57.2%



TORQUE 1 kip-ft
38 mph WIND - 1.0000 in ICE



TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
Phone: (919) 755-1012
FAX: (919) 755-1031
Tower Analysis

Job: Hayden Station, BU# 876326			
Project: 12-04546E S2			
Client: Crown Castle USA, Inc.	Drawn by: Jeff Theberge	App'd:	
Code: TIA/EIA-222-F	Date: 10/26/12	Scale: NTS	
Path: \\FDH-SERVER\Projects\2012 Projects\14 - Apps\12-04546E\Hayden Station, CT\S2 - SA, SK\Analysis\876326.eri		Dwg No. E-1	

tnxTower	Job	Page
	Hayden Station, BU# 876326	1 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	Project 12-04546E S2	Date 12:23:39 10/26/12
	Client Crown Castle USA, Inc.	Designed by Jeff Theberge

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	96.00-85.00	11.00	P12x.5	A53-B-35 (35 ksi)	
L2	85.00-65.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	65.00-32.50	32.50	P48x3/8	A53-B-42 (42 ksi)	
L4	32.50-0.00	32.50	P48x1/2	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 96.00-85.00				1	1	1		
L2 85.00-65.00				1	1	1		
L3 65.00-32.50				1	1	1		
L4 32.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	B	No	Inside Pole	92.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98B-002-75000(3/8")	B	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	92.00 - 0.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
*								
ATCB-B01-001(5/16)	A	No	Inside Pole	83.00 - 0.00	6	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	83.00 - 0.00	3	No Ice	0.05	0.14
						1/2" Ice	0.15	0.76
						1" Ice	0.25	2.00
						2" Ice	0.45	6.30
						4" Ice	0.85	22.23
LDF7-50A(1-5/8")	A	No	Inside Pole	83.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	83.00 - 0.00	3	No Ice	0.15	1.08
						1/2" Ice	0.25	2.33
						1" Ice	0.35	4.18
						2" Ice	0.55	9.73
						4" Ice	0.95	28.15
2" Rigid Conduit	A	No	CaAa (Out Of Face)	83.00 - 0.00	1	No Ice	0.20	2.80
						1/2" Ice	0.30	4.33
						1" Ice	0.40	6.47
						2" Ice	0.60	12.57
						4" Ice	1.00	32.12
*								
AL5-50(7/8)	C	No	CaAa (Out Of Face)	75.00 - 0.00	6	No Ice	0.11	0.26
						1/2" Ice	0.21	1.24

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.31	2.83
						2" Ice	0.51	7.83
						4" Ice	0.91	25.18
LDF5-50A(7/8")	C	No	Inside Pole	75.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
*								
Safety Line 3/8	C	No	CaAa (Out Of Face)	96.00 - 0.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.412	0.00
L2	85.00-65.00	A	0.000	0.000	0.000	14.724	0.21
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	7.350	0.06
L3	65.00-32.50	A	0.000	0.000	0.000	26.585	0.38
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	22.669	0.19
L4	32.50-0.00	A	0.000	0.000	0.000	26.585	0.38
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	22.669	0.19

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	1.129	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	2.896	0.02
L2	85.00-65.00	A	1.104	0.000	0.000	0.000	42.533	0.61
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	25.006	0.27
L3	65.00-32.50	A	1.049	0.000	0.000	0.000	74.312	1.04
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	70.395	0.77
L4	32.50-0.00	A	1.000	0.000	0.000	0.000	72.085	0.99
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	68.168	0.72

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	96.00-85.00	-0.0471	0.0272	-0.2400	0.1386
L2	85.00-65.00	-0.3629	-0.6300	-0.8051	-1.1164
L3	65.00-32.50	-0.6571	-0.5105	-1.3046	-0.8370
L4	32.50-0.00	-0.6571	-0.5105	-1.2849	-0.8271

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP21401	A	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) RRUS-11	A	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.70 12.42 13.15 14.64 17.91	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.13
DC6-48-60-18-8F	A	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	0.02 0.05 0.09 0.17 0.38
7770.00 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.12 6.63 7.13 8.16	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	10.36	10.41	0.66
(2) RRUS-11	B	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
P65-17-XLH-RR w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.70 12.42 13.15 14.64 17.91	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.13
7770.00 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) RRUS-11	C	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.70 12.42 13.15 14.64 17.91	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.13
T-Arm Mount [TA 601-1]	C	None		0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.67 8.82 10.97 15.27 23.87	3.02 4.20 5.38 7.74 12.46	0.24 0.31 0.38 0.51 0.77
Side Arm Mount [SO 102-3]	C	None		0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
***									
***									
(2) 58000 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.62 4.03 4.44 5.38 7.41	3.12 3.83 4.49 5.88 8.84	0.03 0.06 0.10 0.20 0.50
HORIZON DUO	A	From Leg	4.00 0.00 3.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.00 1.60	0.34 0.43 0.52 0.73 1.25	0.01 0.01 0.02 0.04 0.10
840 10045 w/ Mount Pipe	A	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.63 5.66 6.42 7.97 11.33	4.63 5.66 6.42 7.97 11.33	0.06 0.11 0.17 0.30 0.68
WIMAX DAP HEAD	A	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.80 1.99 2.18 2.59	0.78 0.92 1.07 1.39	0.03 0.04 0.06 0.09

tnxTower	Job: Hayden Station, BU# 876326	Page: 6 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	Project: 12-04546E S2	Date: 12:23:39 10/26/12
	Client: Crown Castle USA, Inc.	Designed by: Jeff Theberge

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	3.51	2.14	0.20
(2) 58000 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.62 4.03 4.44 5.38 7.41	3.12 3.83 4.49 5.88 8.84	0.03 0.06 0.10 0.20 0.50
HORIZON DUO	B	From Leg	4.00 0.00 3.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.00 1.60	0.34 0.43 0.52 0.73 1.25	0.01 0.01 0.02 0.04 0.10
840 10045 w/ Mount Pipe	B	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.63 5.66 6.42 7.97 11.33	4.63 5.66 6.42 7.97 11.33	0.06 0.11 0.17 0.30 0.68
WIMAX DAP HEAD	B	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
(2) 58000 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.62 4.03 4.44 5.38 7.41	3.12 3.83 4.49 5.88 8.84	0.03 0.06 0.10 0.20 0.50
HORIZON DUO	C	From Leg	4.00 0.00 3.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.00 1.60	0.34 0.43 0.52 0.73 1.25	0.01 0.01 0.02 0.04 0.10
840 10045 w/ Mount Pipe	C	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.63 5.66 6.42 7.97 11.33	4.63 5.66 6.42 7.97 11.33	0.06 0.11 0.17 0.30 0.68
WIMAX DAP HEAD	C	From Leg	4.00 0.00 -1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
Platform Mount [LP 404-1]	C	None		0.0000	83.00	No Ice	32.79	32.79	2.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	44.63	44.63	2.48
						1" Ice	56.47	56.47	2.91
						2" Ice	80.15	80.15	3.77
						4" Ice	127.51	127.51	5.50
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
800MHz 2X50W RRH W/FILTER	C	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 102-3]	C	None		0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
***									
DR65-18-00DPL2Q w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
ONEBASE TWIN DUAL DUPLEX TMA	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.67 0.79 0.91 1.18 1.82	0.31 0.39 0.49 0.70 1.23	0.01 0.02 0.02 0.04 0.10
APX16DWV-16DWV-S-E-A CU w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.10 0.16 0.28 0.65
APX16DWV-16DWV-S-E-A	C	From Leg	4.00	0.0000	75.00	No Ice	6.94	3.29	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
CU w/ Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	7.44 7.94 8.98 11.17	4.00 4.66 6.04 9.02	0.10 0.16 0.28 0.65
DR65-18-00DPL2Q w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
ONEBASE TWIN DUAL DUPLEX TMA	B	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.67 0.79 0.91 1.18 1.82	0.31 0.39 0.49 0.70 1.23	0.01 0.02 0.02 0.04 0.10
ONEBASE TWIN DUAL DUPLEX TMA	C	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.67 0.79 0.91 1.18 1.82	0.31 0.39 0.49 0.70 1.23	0.01 0.02 0.02 0.04 0.10
APX16DWV-16DWV-S-E-A CU w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.10 0.16 0.28 0.65
DR65-18-00DPL2Q w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
Platform Mount [LP 303-1]	C	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
***									
Lightning Rod 1/2"x4'	A	From Face	0.00 0.00 2.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.20 0.61 0.95 1.46 2.64	0.20 0.61 0.95 1.46 2.64	0.03 0.03 0.04 0.06 0.13
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-11G-4-C	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00	0.0000		83.00	4.23	No Ice 1/2" Ice	14.08 14.63	0.12 0.20

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
				3.00					1" Ice	15.19	0.27
									2" Ice	16.31	0.42
									4" Ice	18.55	0.72
A-ANT-11G-4-C	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	0.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice	14.08 14.63 15.19	0.12 0.20 0.27
									2" Ice	16.31	0.42
									4" Ice	18.55	0.72
A-ANT-11G-4-C	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	0.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice	14.08 14.63 15.19	0.12 0.20 0.27
									2" Ice	16.31	0.42
									4" Ice	18.55	0.72

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service

Comb. No.	Description
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	96 - 85	Pole	Max Tension	8	0.00	-0.00	0.00
			Max. Compression	14	-4.78	0.03	0.15
			Max. Mx	11	-2.31	23.34	0.12
			Max. My	2	-2.31	0.02	22.85
			Max. Vy	11	-4.58	23.34	0.12
			Max. Vx	8	4.52	0.02	-22.84
			Max. Torque	5			0.94
L2	85 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.14	0.37	0.86
			Max. Mx	11	-10.72	226.43	2.23
			Max. My	8	-10.72	0.05	-224.63
			Max. Vy	11	-12.61	226.43	2.23
			Max. Vx	8	12.56	0.05	-224.63
			Max. Torque	5			1.05
L3	65 - 32.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.41	1.48	1.95
			Max. Mx	11	-17.73	701.48	5.73
			Max. My	8	-17.73	0.15	-697.43
			Max. Vy	11	-16.50	701.48	5.73
			Max. Vx	8	16.45	0.15	-697.43
			Max. Torque	5			1.22
L4	32.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.51	2.51	2.99
			Max. Mx	11	-26.87	1293.01	9.20
			Max. My	8	-26.87	0.25	-1286.73
			Max. Vy	11	-19.86	1293.01	9.20
			Max. Vx	8	19.81	0.25	-1286.73
			Max. Torque	5			1.37

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	41.51	0.00	0.00
	Max. H_x	11	26.88	19.85	0.10
	Max. H_z	2	26.88	0.00	19.73
	Max. M_x	2	1282.71	0.00	19.73
	Max. M_z	5	1292.51	-19.85	0.10
	Max. Torsion	5	1.37	-19.85	0.10
	Min. Vert	8	26.88	0.00	-19.80
	Min. H_x	5	26.88	-19.85	0.10
	Min. H_z	8	26.88	0.00	-19.80
	Min. M_x	8	-1286.73	0.00	-19.80
	Min. M_z	11	-1293.01	19.85	0.10
	Min. Torsion	11	-1.37	19.85	0.10

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.88	0.00	-0.00	-0.95	0.25	0.00
Dead+Wind 0 deg - No Ice	26.88	-0.00	-19.73	-1282.71	0.25	-0.48
Dead+Wind 30 deg - No Ice	26.88	10.01	-17.09	-1111.18	-653.28	-0.06
Dead+Wind 60 deg - No Ice	26.88	17.20	-9.90	-644.83	-1120.20	-0.82
Dead+Wind 90 deg - No Ice	26.88	19.85	-0.10	-9.20	-1292.51	-1.37
Dead+Wind 120 deg - No Ice	26.88	17.15	9.87	639.95	-1115.06	-0.35
Dead+Wind 150 deg - No Ice	26.88	9.84	17.19	1117.51	-638.99	0.76
Dead+Wind 180 deg - No Ice	26.88	-0.00	19.80	1286.73	0.25	0.48
Dead+Wind 210 deg - No Ice	26.88	-9.84	17.19	1117.51	639.49	0.06
Dead+Wind 240 deg - No Ice	26.88	-17.15	9.87	639.95	1115.55	0.82
Dead+Wind 270 deg - No Ice	26.88	-19.85	-0.10	-9.20	1293.01	1.37
Dead+Wind 300 deg - No Ice	26.88	-17.20	-9.90	-644.83	1120.69	0.35
Dead+Wind 330 deg - No Ice	26.88	-10.01	-17.09	-1111.18	653.77	-0.76
Dead+Ice+Temp	41.51	-0.00	-0.00	-2.99	2.51	0.00
Dead+Wind 0 deg+Ice+Temp	41.51	0.00	-6.81	-429.48	2.54	-0.37
Dead+Wind 30 deg+Ice+Temp	41.51	3.44	-5.89	-372.38	-213.71	-0.33
Dead+Wind 60 deg+Ice+Temp	41.51	5.92	-3.41	-216.97	-369.24	-0.48
Dead+Wind 90 deg+Ice+Temp	41.51	6.84	-0.02	-5.03	-426.51	-0.51
Dead+Wind 120 deg+Ice+Temp	41.51	5.91	3.40	210.19	-368.00	-0.11
Dead+Wind 150 deg+Ice+Temp	41.51	3.40	5.92	368.31	-210.26	0.32
Dead+Wind 180 deg+Ice+Temp	41.51	0.00	6.82	424.85	2.54	0.37
Dead+Wind 210 deg+Ice+Temp	41.51	-3.40	5.92	368.31	215.35	0.33
Dead+Wind 240 deg+Ice+Temp	41.51	-5.91	3.40	210.19	373.09	0.48
Dead+Wind 270 deg+Ice+Temp	41.51	-6.84	-0.02	-5.03	431.60	0.51
Dead+Wind 300 deg+Ice+Temp	41.51	-5.92	-3.41	-216.97	374.33	0.11
Dead+Wind 330 deg+Ice+Temp	41.51	-3.44	-5.89	-372.38	218.80	-0.32
Dead+Wind 0 deg - Service	26.88	0.00	-7.71	-502.06	0.25	-0.19
Dead+Wind 30 deg - Service	26.88	3.91	-6.68	-434.97	-255.23	-0.02
Dead+Wind 60 deg - Service	26.88	6.72	-3.87	-252.66	-437.76	-0.32
Dead+Wind 90 deg - Service	26.88	7.76	-0.04	-4.18	-505.13	-0.53
Dead+Wind 120 deg - Service	26.88	6.70	3.86	249.59	-435.76	-0.14
Dead+Wind 150 deg - Service	26.88	3.85	6.72	436.28	-249.65	0.30
Dead+Wind 180 deg - Service	26.88	0.00	7.74	502.46	0.25	0.19
Dead+Wind 210 deg - Service	26.88	-3.85	6.72	436.28	250.14	0.02
Dead+Wind 240 deg - Service	26.88	-6.70	3.86	249.59	436.25	0.32
Dead+Wind 270 deg - Service	26.88	-7.76	-0.04	-4.18	505.62	0.53
Dead+Wind 300 deg - Service	26.88	-6.72	-3.87	-252.66	438.26	0.14
Dead+Wind 330 deg - Service	26.88	-3.91	-6.68	-434.97	255.73	-0.30

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-26.88	0.00	0.00	26.88	0.00	0.000%
2	0.00	-26.88	-19.73	0.00	26.88	19.73	0.003%
3	10.01	-26.88	-17.09	-10.01	26.88	17.09	0.001%
4	17.20	-26.88	-9.90	-17.20	26.88	9.90	0.001%
5	19.85	-26.88	-0.10	-19.85	26.88	0.10	0.001%
6	17.15	-26.88	9.87	-17.15	26.88	-9.87	0.001%
7	9.84	-26.88	17.19	-9.84	26.88	-17.19	0.001%
8	0.00	-26.88	19.80	0.00	26.88	-19.80	0.003%
9	-9.84	-26.88	17.19	9.84	26.88	-17.19	0.001%
10	-17.15	-26.88	9.87	17.15	26.88	-9.87	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
11	-19.85	-26.88	-0.10	19.85	26.88	0.10	0.001%
12	-17.20	-26.88	-9.90	17.20	26.88	9.90	0.001%
13	-10.01	-26.88	-17.09	10.01	26.88	17.09	0.001%
14	0.00	-41.51	0.00	0.00	41.51	0.00	0.000%
15	0.00	-41.51	-6.81	-0.00	41.51	6.81	0.000%
16	3.44	-41.51	-5.89	-3.44	41.51	5.89	0.000%
17	5.92	-41.51	-3.41	-5.92	41.51	3.41	0.000%
18	6.84	-41.51	-0.02	-6.84	41.51	0.02	0.000%
19	5.91	-41.51	3.40	-5.91	41.51	-3.40	0.000%
20	3.40	-41.51	5.92	-3.40	41.51	-5.92	0.000%
21	0.00	-41.51	6.82	-0.00	41.51	-6.82	0.000%
22	-3.40	-41.51	5.92	3.40	41.51	-5.92	0.000%
23	-5.91	-41.51	3.40	5.91	41.51	-3.40	0.000%
24	-6.84	-41.51	-0.02	6.84	41.51	0.02	0.000%
25	-5.92	-41.51	-3.41	5.92	41.51	3.41	0.000%
26	-3.44	-41.51	-5.89	3.44	41.51	5.89	0.000%
27	0.00	-26.88	-7.71	-0.00	26.88	7.71	0.001%
28	3.91	-26.88	-6.68	-3.91	26.88	6.68	0.001%
29	6.72	-26.88	-3.87	-6.72	26.88	3.87	0.001%
30	7.76	-26.88	-0.04	-7.76	26.88	0.04	0.001%
31	6.70	-26.88	3.86	-6.70	26.88	-3.86	0.001%
32	3.85	-26.88	6.72	-3.85	26.88	-6.72	0.001%
33	0.00	-26.88	7.74	-0.00	26.88	-7.74	0.001%
34	-3.85	-26.88	6.72	3.85	26.88	-6.72	0.001%
35	-6.70	-26.88	3.86	6.70	26.88	-3.86	0.001%
36	-7.76	-26.88	-0.04	7.76	26.88	0.04	0.001%
37	-6.72	-26.88	-3.87	6.72	26.88	3.87	0.001%
38	-3.91	-26.88	-6.68	3.91	26.88	6.68	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	8	0.00000001	0.00012166
3	Yes	9	0.00000001	0.00011401
4	Yes	9	0.00000001	0.00012204
5	Yes	9	0.00000001	0.00006104
6	Yes	9	0.00000001	0.00009882
7	Yes	9	0.00000001	0.00009327
8	Yes	8	0.00000001	0.00012183
9	Yes	9	0.00000001	0.00010005
10	Yes	9	0.00000001	0.00009495
11	Yes	9	0.00000001	0.00006107
12	Yes	9	0.00000001	0.00011546
13	Yes	9	0.00000001	0.00012548
14	Yes	6	0.00000001	0.00000001
15	Yes	10	0.00000001	0.00006342
16	Yes	10	0.00000001	0.00006455
17	Yes	10	0.00000001	0.00006443
18	Yes	10	0.00000001	0.00006296
19	Yes	10	0.00000001	0.00006355
20	Yes	10	0.00000001	0.00006358
21	Yes	10	0.00000001	0.00006260
22	Yes	10	0.00000001	0.00006404
23	Yes	10	0.00000001	0.00006427

24	Yes	10	0.00000001	0.00006376
25	Yes	10	0.00000001	0.00006511
26	Yes	10	0.00000001	0.00006502
27	Yes	8	0.00000001	0.00005873
28	Yes	8	0.00000001	0.00005604
29	Yes	8	0.00000001	0.00005936
30	Yes	8	0.00000001	0.00006705
31	Yes	8	0.00000001	0.00005253
32	Yes	8	0.00000001	0.00005254
33	Yes	8	0.00000001	0.00005876
34	Yes	8	0.00000001	0.00005275
35	Yes	8	0.00000001	0.00005237
36	Yes	8	0.00000001	0.00006712
37	Yes	8	0.00000001	0.00005684
38	Yes	8	0.00000001	0.00006059

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	4.140	37	0.3208	0.0019
L2	85 - 65	3.413	37	0.2966	0.0009
L3	65 - 32.5	2.205	37	0.2730	0.0006
L4	32.5 - 0	0.636	37	0.1699	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
96.00	Lightning Rod 1/2"x4'	37	4.140	0.3208	0.0019	54784
92.00	7770.00 w/ Mount Pipe	37	3.873	0.3111	0.0015	54784
86.00	A-ANT-11G-4-C	37	3.478	0.2984	0.0010	29016
83.00	(2) 58000 w/ Mount Pipe	37	3.285	0.2935	0.0008	27012
81.00	800MHz 2X50W RRH W/FILTER	37	3.159	0.2908	0.0007	28110
75.00	DR65-18-00DPL2Q w/ Mount Pipe	37	2.791	0.2844	0.0006	34749

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	10.579	11	0.8196	0.0048
L2	85 - 65	8.722	11	0.7580	0.0023
L3	65 - 32.5	5.634	11	0.6977	0.0016
L4	32.5 - 0	1.625	11	0.4342	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
96.00	Lightning Rod 1/2"x4'	11	10.579	0.8196	0.0048	21506
92.00	7770.00 w/ Mount Pipe	11	9.896	0.7950	0.0037	21506
86.00	A-ANT-11G-4-C	11	8.887	0.7625	0.0024	11390
83.00	(2) 58000 w/ Mount Pipe	11	8.396	0.7501	0.0020	10602
81.00	800MHz 2X50W RRH W/FILTER	11	8.074	0.7432	0.0018	11031
75.00	DR65-18-00DPL2Q w/ Mount Pipe	11	7.134	0.7268	0.0015	13625

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	96 - 95	P12x.5	11.00	0.00	0.0	21.000	19.2423	-0.13	404.09	0.000
	95 - 94					21.000	19.2423	-0.17	404.09	0.000
	94 - 93					21.000	19.2423	-0.24	404.09	0.001
	93 - 92					21.000	19.2423	-0.31	404.09	0.001
	92 - 91					21.000	19.2423	-1.55	404.09	0.004
	91 - 90					21.000	19.2423	-1.62	404.09	0.004
	90 - 89					21.000	19.2423	-1.69	404.09	0.004
	89 - 88					21.000	19.2423	-1.76	404.09	0.004
	88 - 87					21.000	19.2423	-1.83	404.09	0.005
	87 - 86					21.000	19.2423	-1.90	404.09	0.005
	86 - 85					21.000	19.2423	-2.31	404.09	0.006
L2	85 - 84	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-2.49	1113.69	0.002
	84 - 83					22.711	49.0383	-2.68	1113.69	0.002
	83 - 82					22.711	49.0383	-5.57	1113.69	0.005
	82 - 81					22.711	49.0383	-5.76	1113.69	0.005
	81 - 80					22.711	49.0383	-6.38	1113.69	0.006
	80 - 79					22.711	49.0383	-6.56	1113.69	0.006
	79 - 78					22.711	49.0383	-6.75	1113.69	0.006
	78 - 77					22.711	49.0383	-6.93	1113.69	0.006
	77 - 76					22.711	49.0383	-7.12	1113.69	0.006
	76 - 75					22.711	49.0383	-7.30	1113.69	0.007
	75 - 74					22.711	49.0383	-9.05	1113.69	0.008
	74 - 73					22.711	49.0383	-9.23	1113.69	0.008
	73 - 72					22.711	49.0383	-9.42	1113.69	0.008
	72 - 71					22.711	49.0383	-9.61	1113.69	0.009
	71 - 70					22.711	49.0383	-9.79	1113.69	0.009
	70 - 69					22.711	49.0383	-9.98	1113.69	0.009
	69 - 68					22.711	49.0383	-10.16	1113.69	0.009
	68 - 67					22.711	49.0383	-10.35	1113.69	0.009
	67 - 66					22.711	49.0383	-10.54	1113.69	0.009
	66 - 65					22.711	49.0383	-10.72	1113.69	0.010
L3	65 - 63.375	P48x3/8	32.50	0.00	0.0	21.972	56.1069	-11.07	1232.77	0.009
	63.375 - 61.75					21.972	56.1069	-11.42	1232.77	0.009
	61.75 - 60.125					21.972	56.1069	-11.77	1232.77	0.010
	60.125 - 58.5					21.972	56.1069	-12.12	1232.77	0.010
	58.5 - 56.875					21.972	56.1069	-12.46	1232.77	0.010
	56.875 - 55.25					21.972	56.1069	-12.81	1232.77	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	55.25 - 53.625					21.972	56.1069	-13.16	1232.77	0.011
	53.625 - 52					21.972	56.1069	-13.51	1232.77	0.011
	52 - 50.375					21.972	56.1069	-13.86	1232.77	0.011
	50.375 - 48.75					21.972	56.1069	-14.21	1232.77	0.012
	48.75 - 47.125					21.972	56.1069	-14.56	1232.77	0.012
	47.125 - 45.5					21.972	56.1069	-14.91	1232.77	0.012
	45.5 - 43.875					21.972	56.1069	-15.26	1232.77	0.012
	43.875 - 42.25					21.972	56.1069	-15.61	1232.77	0.013
	42.25 - 40.625					21.972	56.1069	-15.96	1232.77	0.013
	40.625 - 39					21.972	56.1069	-16.32	1232.77	0.013
	39 - 37.375					21.972	56.1069	-16.67	1232.77	0.014
	37.375 - 35.75					21.972	56.1069	-17.02	1232.77	0.014
	35.75 - 34.125					21.972	56.1069	-17.37	1232.77	0.014
	34.125 - 32.5					21.972	56.1069	-17.73	1232.77	0.014
L4	32.5 - 30.875	P48x1/2	32.50	0.00	0.0	23.696	74.6128	-18.18	1768.01	0.010
	30.875 - 29.25					23.696	74.6128	-18.64	1768.01	0.011
	29.25 - 27.625					23.696	74.6128	-19.09	1768.01	0.011
	27.625 - 26					23.696	74.6128	-19.54	1768.01	0.011
	26 - 24.375					23.696	74.6128	-20.00	1768.01	0.011
	24.375 - 22.75					23.696	74.6128	-20.46	1768.01	0.012
	22.75 - 21.125					23.696	74.6128	-20.91	1768.01	0.012
	21.125 - 19.5					23.696	74.6128	-21.37	1768.01	0.012
	19.5 - 17.875					23.696	74.6128	-21.82	1768.01	0.012
	17.875 - 16.25					23.696	74.6128	-22.28	1768.01	0.013
	16.25 - 14.625					23.696	74.6128	-22.74	1768.01	0.013
	14.625 - 13					23.696	74.6128	-23.20	1768.01	0.013
	13 - 11.375					23.696	74.6128	-23.65	1768.01	0.013
	11.375 - 9.75					23.696	74.6128	-24.11	1768.01	0.014
	9.75 - 8.125					23.696	74.6128	-24.57	1768.01	0.014
	8.125 - 6.5					23.696	74.6128	-25.03	1768.01	0.014
	6.5 - 4.875					23.696	74.6128	-25.49	1768.01	0.014
	4.875 - 3.25					23.696	74.6128	-25.95	1768.01	0.015
	3.25 - 1.625					23.696	74.6128	-26.41	1768.01	0.015
	1.625 - 0					23.696	74.6128	-26.87	1768.01	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	96 - 95	P12x.5	0.05	0.011	23.100	0.000	0.00	0.000	23.100	0.000
	95 - 94		0.10	0.021	23.100	0.001	0.00	0.000	23.100	0.000
	94 - 93		0.17	0.036	23.100	0.002	0.00	0.000	23.100	0.000
	93 - 92		0.27	0.057	23.100	0.002	0.00	0.000	23.100	0.000
	92 - 91		3.29	0.696	23.100	0.030	0.00	0.000	23.100	0.000
	91 - 90		6.33	1.340	23.100	0.058	0.00	0.000	23.100	0.000
	90 - 89		9.41	1.990	23.100	0.086	0.00	0.000	23.100	0.000
	89 - 88		12.50	2.646	23.100	0.115	0.00	0.000	23.100	0.000
	88 - 87		15.63	3.306	23.100	0.143	0.00	0.000	23.100	0.000
	87 - 86		18.77	3.972	23.100	0.172	0.00	0.000	23.100	0.000
	86 - 85		23.34	4.938	23.100	0.214	0.00	0.000	23.100	0.000
L2	85 - 84	P42x3/8	27.98	0.664	22.711	0.029	0.00	0.000	22.711	0.000
	84 - 83		32.73	0.776	22.711	0.034	0.00	0.000	22.711	0.000
	83 - 82		40.56	0.962	22.711	0.042	0.00	0.000	22.711	0.000
	82 - 81		49.01	1.163	22.711	0.051	0.00	0.000	22.711	0.000
	81 - 80		58.21	1.381	22.711	0.061	0.00	0.000	22.711	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	80 - 79		67.53	1.602	22.711	0.071	0.00	0.000	22.711	0.000
	79 - 78		76.96	1.826	22.711	0.080	0.00	0.000	22.711	0.000
	78 - 77		86.50	2.052	22.711	0.090	0.00	0.000	22.711	0.000
	77 - 76		96.16	2.281	22.711	0.100	0.00	0.000	22.711	0.000
	76 - 75		105.93	2.513	22.711	0.111	0.00	0.000	22.711	0.000
	75 - 74		117.47	2.787	22.711	0.123	0.00	0.000	22.711	0.000
	74 - 73		129.13	3.064	22.711	0.135	0.00	0.000	22.711	0.000
	73 - 72		140.90	3.343	22.711	0.147	0.00	0.000	22.711	0.000
	72 - 71		152.78	3.625	22.711	0.160	0.00	0.000	22.711	0.000
	71 - 70		164.78	3.909	22.711	0.172	0.00	0.000	22.711	0.000
	70 - 69		176.88	4.197	22.711	0.185	0.00	0.000	22.711	0.000
	69 - 68		189.10	4.487	22.711	0.198	0.00	0.000	22.711	0.000
	68 - 67		201.44	4.779	22.711	0.210	0.00	0.000	22.711	0.000
	67 - 66		213.88	5.074	22.711	0.223	0.00	0.000	22.711	0.000
	66 - 65		226.44	5.372	22.711	0.237	0.00	0.000	22.711	0.000
L3	65 - 63.375	P48x3/8	247.11	4.474	21.972	0.204	0.00	0.000	21.972	0.000
	63.375 - 61.75		268.12	4.854	21.972	0.221	0.00	0.000	21.972	0.000
	61.75 - 60.125		289.47	5.240	21.972	0.239	0.00	0.000	21.972	0.000
	60.125 - 58.5		311.15	5.633	21.972	0.256	0.00	0.000	21.972	0.000
	58.5 - 56.875		333.17	6.032	21.972	0.275	0.00	0.000	21.972	0.000
	56.875 - 55.25		355.51	6.436	21.972	0.293	0.00	0.000	21.972	0.000
	55.25 - 53.625		378.19	6.847	21.972	0.312	0.00	0.000	21.972	0.000
	53.625 - 52		401.19	7.263	21.972	0.331	0.00	0.000	21.972	0.000
	52 - 50.375		424.51	7.685	21.972	0.350	0.00	0.000	21.972	0.000
	50.375 - 48.75		448.15	8.113	21.972	0.369	0.00	0.000	21.972	0.000
	48.75 - 47.125		472.11	8.547	21.972	0.389	0.00	0.000	21.972	0.000
	47.125 - 45.5		496.38	8.986	21.972	0.409	0.00	0.000	21.972	0.000
	45.5 - 43.875		520.97	9.431	21.972	0.429	0.00	0.000	21.972	0.000
	43.875 - 42.25		545.86	9.882	21.972	0.450	0.00	0.000	21.972	0.000
	42.25 - 40.625		571.05	10.338	21.972	0.471	0.00	0.000	21.972	0.000
	40.625 - 39		596.55	10.800	21.972	0.492	0.00	0.000	21.972	0.000
	39 - 37.375		622.35	11.267	21.972	0.513	0.00	0.000	21.972	0.000
	37.375 - 35.75		648.44	11.739	21.972	0.534	0.00	0.000	21.972	0.000
	35.75 - 34.125		674.83	12.217	21.972	0.556	0.00	0.000	21.972	0.000
	34.125 - 32.5		701.50	12.700	21.972	0.578	0.00	0.000	21.972	0.000
L4	32.5 - 30.875	P48x1/2	728.46	9.969	23.696	0.421	0.00	0.000	23.696	0.000
	30.875 - 29.25		755.70	10.342	23.696	0.436	0.00	0.000	23.696	0.000
	29.25 - 27.625		783.23	10.718	23.696	0.452	0.00	0.000	23.696	0.000
	27.625 - 26		811.03	11.099	23.696	0.468	0.00	0.000	23.696	0.000
	26 - 24.375		839.11	11.483	23.696	0.485	0.00	0.000	23.696	0.000
	24.375 - 22.75		867.46	11.871	23.696	0.501	0.00	0.000	23.696	0.000
	22.75 - 21.125		896.09	12.263	23.696	0.518	0.00	0.000	23.696	0.000
	21.125 - 19.5		925.00	12.658	23.696	0.534	0.00	0.000	23.696	0.000
	19.5 - 17.875		954.18	13.058	23.696	0.551	0.00	0.000	23.696	0.000
	17.875 - 16.25		983.64	13.461	23.696	0.568	0.00	0.000	23.696	0.000
	16.25 - 14.625		1013.37	13.868	23.696	0.585	0.00	0.000	23.696	0.000
	14.625 - 13		1043.37	14.278	23.696	0.603	0.00	0.000	23.696	0.000
	13 - 11.375		1073.64	14.692	23.696	0.620	0.00	0.000	23.696	0.000
	11.375 - 9.75		1104.18	15.110	23.696	0.638	0.00	0.000	23.696	0.000
	9.75 - 8.125		1134.99	15.532	23.696	0.655	0.00	0.000	23.696	0.000
	8.125 - 6.5		1166.08	15.957	23.696	0.673	0.00	0.000	23.696	0.000
	6.5 - 4.875		1197.42	16.386	23.696	0.692	0.00	0.000	23.696	0.000
	4.875 - 3.25		1229.03	16.819	23.696	0.710	0.00	0.000	23.696	0.000
	3.25 - 1.625		1260.91	17.255	23.696	0.728	0.00	0.000	23.696	0.000
	1.625 - 0		1293.04	17.695	23.696	0.747	0.00	0.000	23.696	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	96 - 95	P12x.5	0.02	0.002	14.000	0.000	0.00	0.000	14.000	0.000
	95 - 94		0.06	0.006	14.000	0.000	0.00	0.000	14.000	0.000
	94 - 93		0.08	0.009	14.000	0.001	0.00	0.000	14.000	0.000
	93 - 92		0.11	0.011	14.000	0.001	0.00	0.000	14.000	0.000
	92 - 91		3.03	0.315	14.000	0.023	0.25	0.026	14.000	0.002
	91 - 90		3.06	0.318	14.000	0.023	0.25	0.026	14.000	0.002
	90 - 89		3.08	0.321	14.000	0.023	0.25	0.026	14.000	0.002
	89 - 88		3.11	0.323	14.000	0.023	0.25	0.026	14.000	0.002
	88 - 87		3.14	0.326	14.000	0.023	0.25	0.026	14.000	0.002
	87 - 86		3.16	0.328	14.000	0.023	0.25	0.026	14.000	0.002
	86 - 85		4.58	0.476	14.000	0.034	0.94	0.099	14.000	0.007
L2	85 - 84	P42x3/8	4.69	0.191	16.800	0.011	0.94	0.011	12.473	0.001
	84 - 83		4.81	0.196	16.800	0.012	0.95	0.011	12.473	0.001
	83 - 82		8.38	0.342	16.800	0.020	0.96	0.011	12.473	0.001
	82 - 81		8.50	0.347	16.800	0.021	0.96	0.011	12.473	0.001
	81 - 80		9.26	0.378	16.800	0.022	0.97	0.011	12.473	0.001
	80 - 79		9.37	0.382	16.800	0.023	0.97	0.012	12.473	0.001
	79 - 78		9.49	0.387	16.800	0.023	0.98	0.012	12.473	0.001
	78 - 77		9.60	0.391	16.800	0.023	0.98	0.012	12.473	0.001
	77 - 76		9.71	0.396	16.800	0.024	0.99	0.012	12.473	0.001
	76 - 75		9.83	0.401	16.800	0.024	1.00	0.012	12.473	0.001
	75 - 74		11.60	0.473	16.800	0.028	1.00	0.012	12.473	0.001
	74 - 73		11.71	0.478	16.800	0.028	1.01	0.012	12.473	0.001
	73 - 72		11.82	0.482	16.800	0.029	1.01	0.012	12.473	0.001
	72 - 71		11.94	0.487	16.800	0.029	1.02	0.012	12.473	0.001
	71 - 70		12.05	0.491	16.800	0.029	1.03	0.012	12.473	0.001
	70 - 69		12.16	0.496	16.800	0.030	1.03	0.012	12.473	0.001
	69 - 68		12.28	0.501	16.800	0.030	1.04	0.012	12.473	0.001
	68 - 67		12.39	0.505	16.800	0.030	1.04	0.012	12.473	0.001
	67 - 66		12.50	0.510	16.800	0.030	1.05	0.012	12.473	0.001
	66 - 65		12.61	0.514	16.800	0.031	1.05	0.013	12.473	0.001
L3	65 - 63.375	P48x3/8	12.82	0.457	16.800	0.027	1.06	0.010	11.284	0.001
	63.375 - 61.75		13.03	0.465	16.800	0.028	1.07	0.010	11.284	0.001
	61.75 - 60.125		13.24	0.472	16.800	0.028	1.08	0.010	11.284	0.001
	60.125 - 58.5		13.44	0.479	16.800	0.029	1.09	0.010	11.284	0.001
	58.5 - 56.875		13.65	0.487	16.800	0.029	1.10	0.010	11.284	0.001
	56.875 - 55.25		13.85	0.494	16.800	0.029	1.11	0.010	11.284	0.001
	55.25 - 53.625		14.05	0.501	16.800	0.030	1.11	0.010	11.284	0.001
	53.625 - 52		14.25	0.508	16.800	0.030	1.12	0.010	11.284	0.001
	52 - 50.375		14.45	0.515	16.800	0.031	1.13	0.010	11.284	0.001
	50.375 - 48.75		14.64	0.522	16.800	0.031	1.14	0.010	11.284	0.001
	48.75 - 47.125		14.84	0.529	16.800	0.031	1.15	0.010	11.284	0.001
	47.125 - 45.5		15.03	0.536	16.800	0.032	1.16	0.010	11.284	0.001
	45.5 - 43.875		15.22	0.543	16.800	0.032	1.16	0.011	11.284	0.001
	43.875 - 42.25		15.41	0.549	16.800	0.033	1.17	0.011	11.284	0.001
	42.25 - 40.625		15.60	0.556	16.800	0.033	1.18	0.011	11.284	0.001
	40.625 - 39		15.78	0.563	16.800	0.033	1.19	0.011	11.284	0.001
	39 - 37.375		15.97	0.569	16.800	0.034	1.20	0.011	11.284	0.001
	37.375 - 35.75		16.15	0.576	16.800	0.034	1.20	0.011	11.284	0.001
	35.75 - 34.125		16.33	0.582	16.800	0.035	1.21	0.011	11.284	0.001
	34.125 - 32.5		16.51	0.588	16.800	0.035	1.22	0.011	11.284	0.001
L4	32.5 - 30.875	P48x1/2	16.68	0.447	16.800	0.027	1.23	0.008	16.167	0.001
	30.875 - 29.25		16.85	0.452	16.800	0.027	1.23	0.008	16.167	0.001
	29.25 - 27.625		17.02	0.456	16.800	0.027	1.24	0.008	16.167	0.001
	27.625 - 26		17.19	0.461	16.800	0.027	1.25	0.009	16.167	0.001
	26 - 24.375		17.36	0.465	16.800	0.028	1.26	0.009	16.167	0.001
	24.375 - 22.75		17.54	0.470	16.800	0.028	1.26	0.009	16.167	0.001
	22.75 - 21.125		17.71	0.475	16.800	0.028	1.27	0.009	16.167	0.001
	21.125 - 19.5		17.87	0.479	16.800	0.029	1.28	0.009	16.167	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	19.5 - 17.875		18.04	0.484	16.800	0.029	1.29	0.009	16.167	0.001
	17.875 - 16.25		18.21	0.488	16.800	0.029	1.29	0.009	16.167	0.001
	16.25 - 14.625		18.38	0.493	16.800	0.029	1.30	0.009	16.167	0.001
	14.625 - 13		18.55	0.497	16.800	0.030	1.31	0.009	16.167	0.001
	13 - 11.375		18.71	0.502	16.800	0.030	1.32	0.009	16.167	0.001
	11.375 - 9.75		18.88	0.506	16.800	0.030	1.32	0.009	16.167	0.001
	9.75 - 8.125		19.05	0.511	16.800	0.030	1.33	0.009	16.167	0.001
	8.125 - 6.5		19.21	0.515	16.800	0.031	1.34	0.009	16.167	0.001
	6.5 - 4.875		19.37	0.519	16.800	0.031	1.35	0.009	16.167	0.001
	4.875 - 3.25		19.54	0.524	16.800	0.031	1.35	0.009	16.167	0.001
	3.25 - 1.625		19.70	0.528	16.800	0.031	1.36	0.009	16.167	0.001
	1.625 - 0		19.86	0.532	16.800	0.032	1.37	0.009	16.167	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	96 - 95	0.000	0.000	0.000	0.000	0.000	0.001 ✔	1.333	H1-3+VT ✔
	95 - 94	0.000	0.001	0.000	0.000	0.000	0.001 ✔	1.333	H1-3+VT ✔
	94 - 93	0.001	0.002	0.000	0.001	0.000	0.002 ✔	1.333	H1-3+VT ✔
	93 - 92	0.001	0.002	0.000	0.001	0.000	0.003 ✔	1.333	H1-3+VT ✔
	92 - 91	0.004	0.030	0.000	0.023	0.002	0.035 ✔	1.333	H1-3+VT ✔
	91 - 90	0.004	0.058	0.000	0.023	0.002	0.063 ✔	1.333	H1-3+VT ✔
	90 - 89	0.004	0.086	0.000	0.023	0.002	0.091 ✔	1.333	H1-3+VT ✔
	89 - 88	0.004	0.115	0.000	0.023	0.002	0.119 ✔	1.333	H1-3+VT ✔
	88 - 87	0.005	0.143	0.000	0.023	0.002	0.148 ✔	1.333	H1-3+VT ✔
	87 - 86	0.005	0.172	0.000	0.023	0.002	0.177 ✔	1.333	H1-3+VT ✔
	86 - 85	0.006	0.214	0.000	0.034	0.007	0.221 ✔	1.333	H1-3+VT ✔
L2	85 - 84	0.002	0.029	0.000	0.011	0.001	0.032 ✔	1.333	H1-3+VT ✔
	84 - 83	0.002	0.034	0.000	0.012	0.001	0.037 ✔	1.333	H1-3+VT ✔
	83 - 82	0.005	0.042	0.000	0.020	0.001	0.048 ✔	1.333	H1-3+VT ✔
	82 - 81	0.005	0.051	0.000	0.021	0.001	0.057 ✔	1.333	H1-3+VT ✔
	81 - 80	0.006	0.061	0.000	0.022	0.001	0.067 ✔	1.333	H1-3+VT ✔

tnxTower	Job: Hayden Station, BU# 876326	Page: 19 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	Project: 12-04546E S2	Date: 12:23:39 10/26/12
	Client: Crown Castle USA, Inc.	Designed by: Jeff Theberge

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	80 - 79	0.006	0.071	0.000	0.023	0.001	0.077 ✔	1.333	H1-3+VT ✔
	79 - 78	0.006	0.080	0.000	0.023	0.001	0.087 ✔	1.333	H1-3+VT ✔
	78 - 77	0.006	0.090	0.000	0.023	0.001	0.097 ✔	1.333	H1-3+VT ✔
	77 - 76	0.006	0.100	0.000	0.024	0.001	0.107 ✔	1.333	H1-3+VT ✔
	76 - 75	0.007	0.111	0.000	0.024	0.001	0.118 ✔	1.333	H1-3+VT ✔
	75 - 74	0.008	0.123	0.000	0.028	0.001	0.132 ✔	1.333	H1-3+VT ✔
	74 - 73	0.008	0.135	0.000	0.028	0.001	0.144 ✔	1.333	H1-3+VT ✔
	73 - 72	0.008	0.147	0.000	0.029	0.001	0.157 ✔	1.333	H1-3+VT ✔
	72 - 71	0.009	0.160	0.000	0.029	0.001	0.169 ✔	1.333	H1-3+VT ✔
	71 - 70	0.009	0.172	0.000	0.029	0.001	0.182 ✔	1.333	H1-3+VT ✔
	70 - 69	0.009	0.185	0.000	0.030	0.001	0.195 ✔	1.333	H1-3+VT ✔
	69 - 68	0.009	0.198	0.000	0.030	0.001	0.208 ✔	1.333	H1-3+VT ✔
	68 - 67	0.009	0.210	0.000	0.030	0.001	0.221 ✔	1.333	H1-3+VT ✔
	67 - 66	0.009	0.223	0.000	0.030	0.001	0.234 ✔	1.333	H1-3+VT ✔
	66 - 65	0.010	0.237	0.000	0.031	0.001	0.247 ✔	1.333	H1-3+VT ✔
L3	65 - 63.375	0.009	0.204	0.000	0.027	0.001	0.213 ✔	1.333	H1-3+VT ✔
	63.375 - 61.75	0.009	0.221	0.000	0.028	0.001	0.231 ✔	1.333	H1-3+VT ✔
	61.75 - 60.125	0.010	0.239	0.000	0.028	0.001	0.249 ✔	1.333	H1-3+VT ✔
	60.125 - 58.5	0.010	0.256	0.000	0.029	0.001	0.267 ✔	1.333	H1-3+VT ✔
	58.5 - 56.875	0.010	0.275	0.000	0.029	0.001	0.286 ✔	1.333	H1-3+VT ✔
	56.875 - 55.25	0.010	0.293	0.000	0.029	0.001	0.304 ✔	1.333	H1-3+VT ✔
	55.25 - 53.625	0.011	0.312	0.000	0.030	0.001	0.323 ✔	1.333	H1-3+VT ✔
	53.625 - 52	0.011	0.331	0.000	0.030	0.001	0.342 ✔	1.333	H1-3+VT ✔
	52 - 50.375	0.011	0.350	0.000	0.031	0.001	0.362 ✔	1.333	H1-3+VT ✔
	50.375 - 48.75	0.012	0.369	0.000	0.031	0.001	0.382 ✔	1.333	H1-3+VT ✔
	48.75 - 47.125	0.012	0.389	0.000	0.031	0.001	0.402 ✔	1.333	H1-3+VT ✔

tnxTower	Job	Page
	Hayden Station, BU# 876326	20 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	**Project** 12-04546E S2	**Date** 12:23:39 10/26/12
	Client Crown Castle USA, Inc.	**Designed by** Jeff Theberge

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	47.125 - 45.5	0.012	0.409	0.000	0.032	0.001	0.422 ✔	1.333	H1-3+VT ✔
	45.5 - 43.875	0.012	0.429	0.000	0.032	0.001	0.443 ✔	1.333	H1-3+VT ✔
	43.875 - 42.25	0.013	0.450	0.000	0.033	0.001	0.464 ✔	1.333	H1-3+VT ✔
	42.25 - 40.625	0.013	0.471	0.000	0.033	0.001	0.485 ✔	1.333	H1-3+VT ✔
	40.625 - 39	0.013	0.492	0.000	0.033	0.001	0.506 ✔	1.333	H1-3+VT ✔
	39 - 37.375	0.014	0.513	0.000	0.034	0.001	0.528 ✔	1.333	H1-3+VT ✔
	37.375 - 35.75	0.014	0.534	0.000	0.034	0.001	0.549 ✔	1.333	H1-3+VT ✔
	35.75 - 34.125	0.014	0.556	0.000	0.035	0.001	0.571 ✔	1.333	H1-3+VT ✔
	34.125 - 32.5	0.014	0.578	0.000	0.035	0.001	0.594 ✔	1.333	H1-3+VT ✔
L4	32.5 - 30.875	0.010	0.421	0.000	0.027	0.001	0.432 ✔	1.333	H1-3+VT ✔
	30.875 - 29.25	0.011	0.436	0.000	0.027	0.001	0.448 ✔	1.333	H1-3+VT ✔
	29.25 - 27.625	0.011	0.452	0.000	0.027	0.001	0.464 ✔	1.333	H1-3+VT ✔
	27.625 - 26	0.011	0.468	0.000	0.027	0.001	0.480 ✔	1.333	H1-3+VT ✔
	26 - 24.375	0.011	0.485	0.000	0.028	0.001	0.497 ✔	1.333	H1-3+VT ✔
	24.375 - 22.75	0.012	0.501	0.000	0.028	0.001	0.513 ✔	1.333	H1-3+VT ✔
	22.75 - 21.125	0.012	0.518	0.000	0.028	0.001	0.530 ✔	1.333	H1-3+VT ✔
	21.125 - 19.5	0.012	0.534	0.000	0.029	0.001	0.547 ✔	1.333	H1-3+VT ✔
	19.5 - 17.875	0.012	0.551	0.000	0.029	0.001	0.564 ✔	1.333	H1-3+VT ✔
	17.875 - 16.25	0.013	0.568	0.000	0.029	0.001	0.582 ✔	1.333	H1-3+VT ✔
	16.25 - 14.625	0.013	0.585	0.000	0.029	0.001	0.599 ✔	1.333	H1-3+VT ✔
	14.625 - 13	0.013	0.603	0.000	0.030	0.001	0.617 ✔	1.333	H1-3+VT ✔
	13 - 11.375	0.013	0.620	0.000	0.030	0.001	0.634 ✔	1.333	H1-3+VT ✔
	11.375 - 9.75	0.014	0.638	0.000	0.030	0.001	0.652 ✔	1.333	H1-3+VT ✔
	9.75 - 8.125	0.014	0.655	0.000	0.030	0.001	0.670 ✔	1.333	H1-3+VT ✔
	8.125 - 6.5	0.014	0.673	0.000	0.031	0.001	0.689 ✔	1.333	H1-3+VT ✔
	6.5 - 4.875	0.014	0.692	0.000	0.031	0.001	0.707 ✔	1.333	H1-3+VT ✔

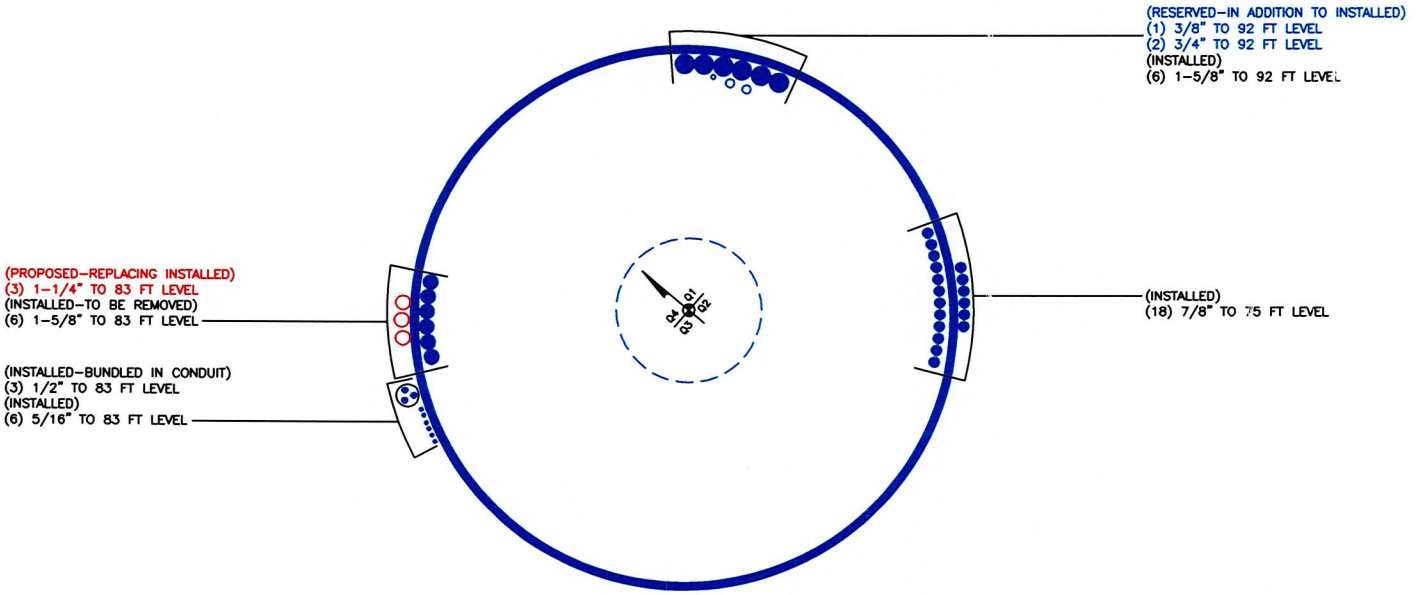
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	4.875 - 3.25	0.015	0.710	0.000	0.031	0.001	0.725 ✔	1.333	H1-3+VT ✔
	3.25 - 1.625	0.015	0.728	0.000	0.031	0.001	0.744 ✔	1.333	H1-3+VT ✔
	1.625 - 0	0.015	0.747	0.000	0.032	0.001	0.763 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	96 - 85	Pole	P12x.5	1	-2.31	538.65	16.6	Pass
L2	85 - 65	Pole	P42x3/8	2	-10.72	1484.55	18.5	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-17.73	1643.28	44.5	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-26.87	2356.76	57.2	Pass
							Summary	
						Pole (L4)	57.2	Pass
						RATING =	**57.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876326 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	Rohn

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	53		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	6.60	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	226.43	ft-kips
Axial:	10.72	kips
Shear:	12.61	kips
Elevation:	65	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

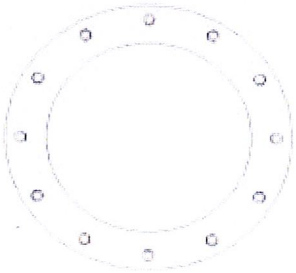
Bolt Tension Capacity, **B**:	103.65 kips	Rigid
Max Bolt directly applied T:	9.72 Kips	Service, ASD
Min. PL "tc" for **B** cap. **w/o** Pry:	3.527 in	Fty*ASIF
Min PL "treq" for actual **T w/ Pry**:	0.813 in	
Min PL "t1" for actual **T w/o Pry**:	1.080 in	
T allowable with Prying:	58.76 kips	α'>1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	9.72 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	9.4% Pass	

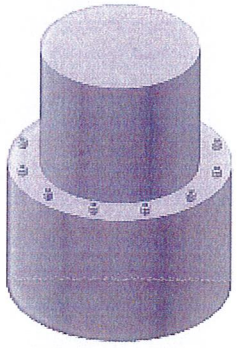
Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	Rohn/Pirod, OK	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Compression Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
No Prying		Comp. Y.L. Length: 32.33
Tension Side Stress Ratio, (treq/t)^2:	16.5% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	Rohn

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	53		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.54	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333

Reactions		
Moment:	701.48	ft-kips
Axial:	17.73	kips
Shear:	16.5	kips
Elevation:	32.5	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

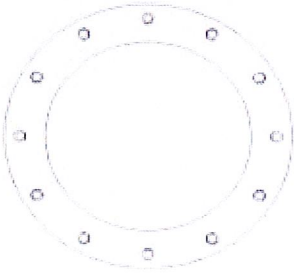
		Rigid
Bolt Tension Capacity, **B**:	103.65 kips	Service, ASD
Max Bolt directly applied T:	30.88 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	2.003 in	
Min PL "treq" for actual **T w/ Pry**:	0.816 in	
Min PL "t1" for actual **T w/o Pry**:	1.093 in	
T allowable with Prying:	103.56 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	30.88 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	29.8% **Pass**	

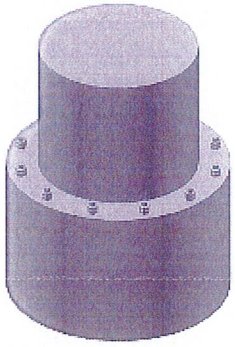
Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		22.47
Tension Side Stress Ratio, (treq/t)^2:	16.7% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	1293	ft-kips
Axial:	27	kips
Shear:	20	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	20	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	53.5	in

Anchor Rod Results

Maximum Rod Tension:	56.7 Kips	Rigid
Allowable Tension:	97.2 Kips	Service, ASD
Anchor Rod Stress Ratio:	58.3% **Pass**	Fty*ASIF

Plate Data		
Diam:	59	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.54	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	20.7 ksi	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	57.5% **Pass**	Y.L. Length: 23.63

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Both	
Groove Depth:	0.4375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	1	in
Grade:	50	ksi
Weld str.:	70	ksi

n/a

Stiffener Results

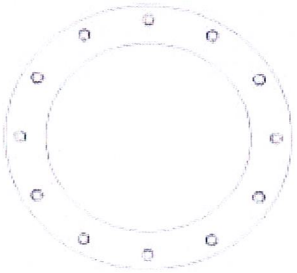
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

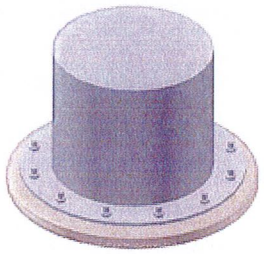
Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

CAISSON Version 10.61 1:25:59 PM Friday, October 26, 2012
FDH Engineering

```
**********************************************************************************************
*                                                                                            *
* CAISSON - Pier Foundations Analysis and Design -  Copyright Power Line Systems, Inc. 1993-2010 *
*                                                                                            *
**********************************************************************************************
```

Project Title: Hayden Station BU 876326
Project Notes:

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
7.00	0.50	3.00	60.00

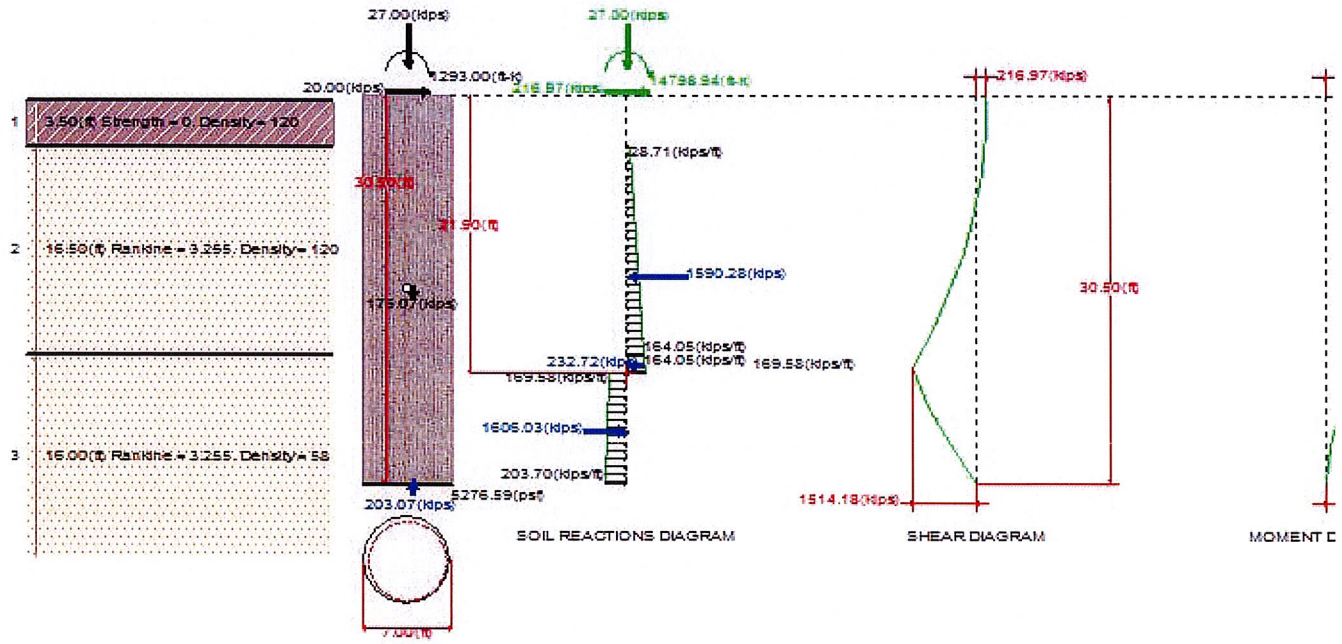
Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	3.50	0.00	120.0			
2	Sand	16.50	3.50	120.0		3.255	32.00
3	Sand	16.00	20.00	58.0		3.255	32.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
1293.0	27.0	20.00	10.80 : Soil Capacity = 2.00/10.80 = 18.5%

******* R E S U L T S



Calculated Pier Properties

Length (ft)	Weight (kips)	Pressure Due To Axial Load (psf)	Pressure Due To Weight (psf)	Total End-Bearing Pressure (psf)
30.500	176.067	701.6	4575.0	5276.6

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.50	3.50	120.0			0.00	2.25
Sand	4.00	16.50	120.0		3.255	1590.28	14.18
Sand	20.50	1.40	58.0		3.255	232.72	21.20
Sand	21.90	8.60	58.0		3.255	-1606.03	26.33

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)	
0.00	217.0	14798.9	20.1	1370.3	
3.05	217.0	15460.7	20.1	1431.5	
6.10	138.6	16046.5	12.8	1485.8	
9.15	-39.7	16216.8	-3.7	1501.6	max
12.20	-294.2	15727.0	-27.2	1456.2	
15.25	-625.1	14344.5	-57.9	1328.2	
18.30	-1032.2	11836.5	-95.6	1096.0	
21.35	-1514.2	7970.7	-140.2	738.0	
24.40	-1168.8	3639.8	-108.2	337.0	
27.45	-602.8	928.7	-55.8	86.0	
30.50	0.0	0.0	0.0	0.0	

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #: *####*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.12	ft
Vert. Cage Diameter =	73.48	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	24	
As Total=	30.48	in^2
A s/ Aconc, Rho:	0.0055	0.55%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027	
200 / Fy:	0.0033	
IBC 1810.1.2:	None	SDC A or B
Governing:	0.0033	**0.33%**

ACI 10.8 and 10.9
Min As for Columns, Comp. Controlled, Shafts:

Min As:	0.0050	**0.50%**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.55%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8258.95	kips
at Mu=(ϕ=0.65)Mn=	5013.77	ft-kips
Max Tu, (φ=0.9) Tn =	1645.92	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	1501.6	ft-kips **(* Note)**
Max. Service Shaft P:	27	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	1952.08	ft-kips
1.30	Pu:	35.1	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2005

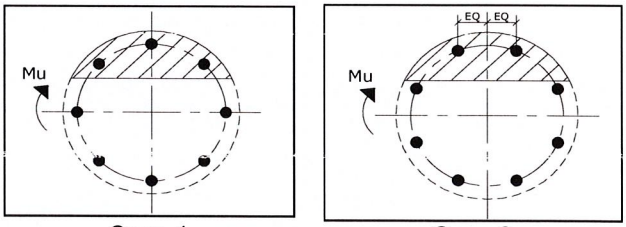
Seismic Properties

Seismic Design Category =	B
Seismic Risk =	**Low**

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**13.40**	in
Extreme Steel Strain, εt:	**0.0146**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

<-- Comment Box

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	35.10	kips
Drilled Shaft Moment Capacity, φMn:	**4815.27**	ft-kips
Drilled Shaft Superimposed Mu:	**1952.08**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**40.54%**

Date: **October 26, 2012**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC065
	Carrier Site Name:	CT03XC065
Crown Castle Designation:	**Crown Castle BU Number:**	876326
	Crown Castle Site Name:	HAYDEN STATION
	Crown Castle JDE Job Number:	190521
	Crown Castle Work Order Number:	540553
	Crown Castle Application Number:	165358 Rev. 2
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	12-04546E S3
Site Data:	**440 Hayden Station Road, WINDSOR, Hartford County, CT** **Latitude *41° 53' 52.2"*, Longitude *-72° 38' 38.7"*** **96 Foot - Monopole Tower**	

Dear Veronica Harris,

FDH Engineering, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 497464, in accordance with application 165358, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *FDH Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Jeff Theberge, EI
Project Engineer

Reviewed by:

J. Darrin Holt, Ph. D., PE
Principal
CT PE License No. 22988

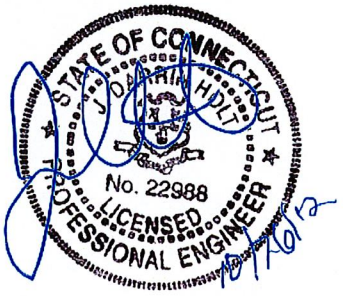


TABLE OF CONTENTS

1) INTRODUCTION

This tower is an 85 ft Monopole tower designed by ROHN in January of 1997. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F. This analysis assumes an 11-ft extension has been added to the original 85 ft tower as proposed by URS Greiner Woodward-Clyde, Inc. project F3000001824.14 dated November 12, 1999.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
83.0	83.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1 1/4	-
81.0	81.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	crown mounts	Side Arm Mount [SO 102-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
92.0	92.0	6	ericsson	RRUS-11	1 2	3/8 3/4	2
		3	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	crown mounts	Side Arm Mount [SO 102-3]			
		3	powerwave technologies	7770.00 w/ Mount Pipe	6	1 5/8	1
		6	powerwave technologies	LGP21401			
		1	crown mounts	T-Arm Mount [TA 601-1]			
83.0	86.0	3	dragonwave	A-ANT-11G-4-C	-	-	3
		3	dragonwave	HORIZON DUO			
	83.0	1	crown mounts	Platform Mount [LP 404-1]	3 6	1/2 5/16	1
		6	dapa	58000 w/ Mount Pipe	6	1 5/8	4
	82.0	3	kathrein	840 10045 w/ Mount Pipe	-	-	3
		3	samsung telecommunications	WIMAX DAP HEAD			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
75.0	75.0	3	andrew	ONEBASE TWIN DUAL DUPLEX TMA	18	7/8	1
		3	ems wireless	DR65-18-00DPL2Q w/ Mount Pipe			
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
		1	crown mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Existing Equipment, Carrier #2
4) Existing Equipment to be Removed, not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
85	85	12	swedcom	ALP9212	12	1 5/8
75	75	12	swedcom	ALP9212	12	1 5/8
60	60	12	swedcom	ALP9212	12	1 5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbor, & Associates LLP (CHA Project No. 5835.07.04) dated August 27, 1996	1530918	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, Inc. (Eng. File No. 34738SW) dated December 23, 1996	1640630	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, Inc. (Eng. File No. 34738SW) dated January 10, 1997	1639483	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	URS Greiner Woodward-Clyde, Inc. (Site CT-140) dated November 12, 1999	1771083	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	96 - 85	Pole	P12x.5	1	-2.31	538.65	16.6	Pass
L2	85 - 65	Pole	P42x3/8	2	-10.47	1484.55	17.5	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-17.31	1643.28	42.2	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-26.28	2356.76	54.6	Pass
							Summary	
						Pole (L4)	54.6	Pass
						RATING =	**54.6**	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	55.5	Pass
1	Base Plate	0	54.8	Pass
1	Base Foundation	0	38.6	Pass
1	Base Foundation Soil Interaction	0	17.6	Pass

Structure Rating (max from all components) =	55.6%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

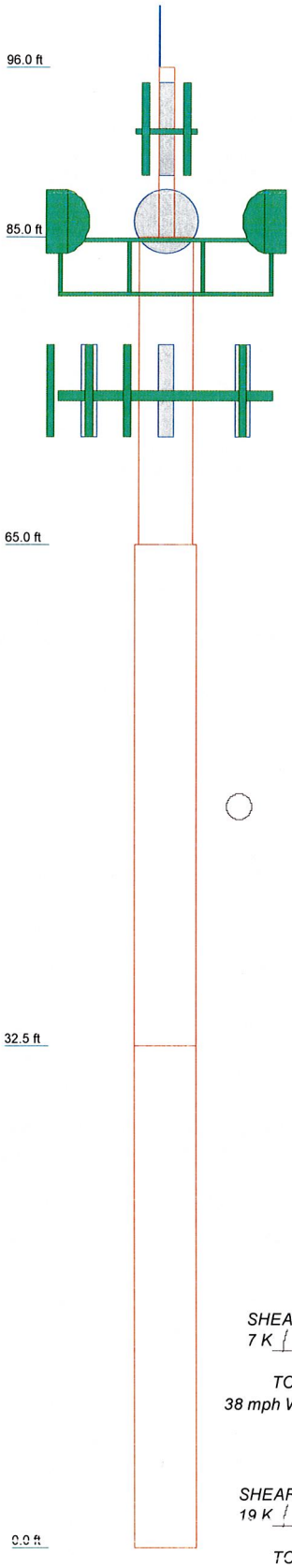
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P12x.5	11.00	A53-B-35	0.7
2	P42x3/8	20.00		3.3
3	P48x3/8	32.50	A53-B-42	6.2
4	P48x1/2	32.50		8.3
				18.5



DESIGNED APPURTENANCE LOADING

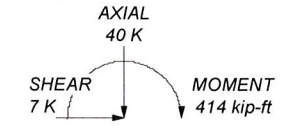
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1/2"x4'	96	APXVSPP18-C-A20 w/ Mount Pipe	83
(2) LGP21401	92	Platform Mount [LP 404-1]	83
(2) LGP21401	92	HORIZON DUO	83
(2) LGP21401	92	A-ANT-11G-4-C	83
(2) RRUS-11	92	A-ANT-11G-4-C	83
P65-17-XLH-RR w/ Mount Pipe	92	A-ANT-11G-4-C	83
DC6-48-60-18-8F	92	800MHz 2X50W RRH W/FILTER	81
7770.00 w/ Mount Pipe	92	PCS 1900MHz 4x45W-65MHz	81
(2) RRUS-11	92	Side Arm Mount [SO 102-3]	81
P65-17-XLH-RR w/ Mount Pipe	92	800MHz 2X50W RRH W/FILTER	81
7770.00 w/ Mount Pipe	92	800MHz 2X50W RRH W/FILTER	81
(2) RRUS-11	92	PCS 1900MHz 4x45W-65MHz	81
P65-17-XLH-RR w/ Mount Pipe	92	PCS 1900MHz 4x45W-65MHz	81
T-Arm Mount [TA 601-1]	92	DR65-18-00DPL2Q w/ Mount Pipe	75
Side Arm Mount [SO 102-3]	92	ONEBASE TWIN DUAL DUPLEX TMA	75
7770.00 w/ Mount Pipe	92	ONEBASE TWIN DUAL DUPLEX TMA	75
840 10045 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
WIMAX DAP HEAD	83		
HORIZON DUO	83	DR65-18-00DPL2Q w/ Mount Pipe	75
840 10045 w/ Mount Pipe	83	Platform Mount [LP 303-1]	75
WIMAX DAP HEAD	83	DR65-18-00DPL2Q w/ Mount Pipe	75
HORIZON DUO	83	ONEBASE TWIN DUAL DUPLEX TMA	75
840 10045 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
WIMAX DAP HEAD	83		
APXVSPP18-C-A20 w/ Mount Pipe	83	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	75
APXVSPP18-C-A20 w/ Mount Pipe	83		

MATERIAL STRENGTH

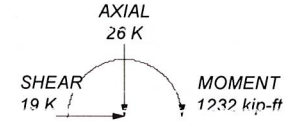
GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 54.6%



TORQUE 1 kip-ft
38 mph WIND - 1.0000 in ICE



TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
Phone: (919) 755-1012
FAX: (919) 755-1031
Tower Analysis

Job: Hayden Station, BU# 876326			
Project: 12-04546E S3			
Client: Crown Castle	Drawn by: Jeff Theberge		App'd:
Code: TIA/EIA-222-F	Date: 10/26/12		Scale: NTS
Path: \\FDH-SERVER\Projects\2012 Projects\4 - Apr\12-04546E\Hayden Station, CT\S3 - SA, RR SNV\Analysis\876326e1			Dwg No. E-1

tnxTower	Job	Page
	Hayden Station, BU# 876326	1 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	**Project** 12-04546E S3	**Date** 13:59:18 10/26/12
	Client Crown Castle	**Designed by** Jeff Theberge

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination				

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	96.00-85.00	11.00	P12x.5	A53-B-35 (35 ksi)	
L2	85.00-65.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	65.00-32.50	32.50	P48x3/8	A53-B-42 (42 ksi)	
L4	32.50-0.00	32.50	P48x1/2	A53-B-42 (42 ksi)	

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 96.00-85.00				1	1	1		
L2 85.00-65.00				1	1	1		
L3 65.00-32.50				1	1	1		
L4 32.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_AA_A	Weight
				ft			ft^2/ft	plf
LDF7-50A(1-5/8")	B	No	Inside Pole	92.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98B-002-75000(3/8")	B	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	92.00 - 0.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
*								
ATCB-B01-001(5/16)	A	No	Inside Pole	83.00 - 0.00	6	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	83.00 - 0.00	3	No Ice	0.05	0.14
						1/2" Ice	0.15	0.76
						1" Ice	0.25	2.00
						2" Ice	0.45	6.30
						4" Ice	0.85	22.23
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	83.00 - 0.00	3	No Ice	0.15	1.08
						1/2" Ice	0.25	2.33
						1" Ice	0.35	4.18
						2" Ice	0.55	9.73
						4" Ice	0.95	28.15
2" Rigid Conduit	A	No	CaAa (Out Of Face)	83.00 - 0.00	1	No Ice	0.20	2.80
						1/2" Ice	0.30	4.33
						1" Ice	0.40	6.47
						2" Ice	0.60	12.57
						4" Ice	1.00	32.12
*								
AL5-50(7/8)	C	No	CaAa (Out Of Face)	75.00 - 0.00	6	No Ice	0.11	0.26
						1/2" Ice	0.21	1.24
						1" Ice	0.31	2.83
						2" Ice	0.51	7.83
						4" Ice	0.91	25.18
LDF5-50A(7/8")	C	No	Inside Pole	75.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
* Safety Line 3/8	C	No	CaAa (Out Of Face)	96.00 - 0.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.412	0.00
L2	85.00-65.00	A	0.000	0.000	0.000	14.724	0.12
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	7.350	0.06
L3	65.00-32.50	A	0.000	0.000	0.000	26.585	0.22
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	22.669	0.19
L4	32.50-0.00	A	0.000	0.000	0.000	26.585	0.22
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	22.669	0.19

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	1.129	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	2.896	0.02
L2	85.00-65.00	A	1.104	0.000	0.000	0.000	42.533	0.52
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	25.006	0.27
L3	65.00-32.50	A	1.049	0.000	0.000	0.000	74.312	0.88
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	70.395	0.77
L4	32.50-0.00	A	1.000	0.000	0.000	0.000	72.085	0.83
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	68.168	0.72

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	96.00-85.00	-0.0471	0.0272	-0.2400	0.1386
L2	85.00-65.00	-0.3629	-0.6300	-0.8051	-1.1164
L3	65.00-32.50	-0.6571	-0.5105	-1.3046	-0.8370
L4	32.50-0.00	-0.6571	-0.5105	-1.2849	-0.8271

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/ Mount Pipe	A	From Leg	1.00	0.00	0.0000	92.00	No Ice	6.12	4.25	0.06
			0.00				1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) LGP21401	A	From Leg	1.00	0.00	0.0000	92.00	No Ice	1.29	0.23	0.01
			0.00				1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
							4" Ice	2.79	1.12	0.14
(2) LGP21401	B	From Leg	1.00	0.00	0.0000	92.00	No Ice	1.29	0.23	0.01
			0.00				1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
							4" Ice	2.79	1.12	0.14
(2) LGP21401	C	From Leg	1.00	0.00	0.0000	92.00	No Ice	1.29	0.23	0.01
			0.00				1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
							4" Ice	2.79	1.12	0.14
(2) RRUS-11	A	From Leg	1.00	0.00	0.0000	92.00	No Ice	2.94	1.25	0.06
			0.00				1/2" Ice	3.17	1.41	0.07
							1" Ice	3.41	1.59	0.10
							2" Ice	3.91	1.96	0.15
							4" Ice	5.02	2.82	0.30
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	1.00	0.00	0.0000	92.00	No Ice	11.70	8.94	0.09
			0.00				1/2" Ice	12.42	10.45	0.17
							1" Ice	13.15	11.99	0.27
							2" Ice	14.64	14.31	0.50
							4" Ice	17.91	19.14	1.13
DC6-48-60-18-8F	A	From Leg	1.00	0.00	0.0000	92.00	No Ice	2.57	4.32	0.02
			0.00				1/2" Ice	2.80	4.60	0.05
							1" Ice	3.04	4.88	0.09
							2" Ice	3.54	5.49	0.17
							4" Ice	4.66	6.80	0.38
7770.00 w/ Mount Pipe	B	From Leg	1.00	0.00	0.0000	92.00	No Ice	6.12	4.25	0.06
			0.00				1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) RRUS-11	B	From Leg	1.00	0.00	0.0000	92.00	No Ice	2.94	1.25	0.06
			0.00				1/2" Ice	3.17	1.41	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.41	1.59	0.10
						2" Ice	3.91	1.96	0.15
						4" Ice	5.02	2.82	0.30
P65-17-XLH-RR w/ Mount Pipe	B	From Leg	1.00	0.0000	92.00	No Ice	11.70	8.94	0.09
			0.00			1/2" Ice	12.42	10.45	0.17
			0.00			1" Ice	13.15	11.99	0.27
						2" Ice	14.64	14.31	0.50
						4" Ice	17.91	19.14	1.13
7770.00 w/ Mount Pipe	C	From Leg	1.00	0.0000	92.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) RRUS-11	C	From Leg	1.00	0.0000	92.00	No Ice	2.94	1.25	0.06
			0.00			1/2" Ice	3.17	1.41	0.07
			0.00			1" Ice	3.41	1.59	0.10
						2" Ice	3.91	1.96	0.15
						4" Ice	5.02	2.82	0.30
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	1.00	0.0000	92.00	No Ice	11.70	8.94	0.09
			0.00			1/2" Ice	12.42	10.45	0.17
			0.00			1" Ice	13.15	11.99	0.27
						2" Ice	14.64	14.31	0.50
						4" Ice	17.91	19.14	1.13
T-Arm Mount [TA 601-1]	C	None		0.0000	92.00	No Ice	6.67	3.02	0.24
						1/2" Ice	8.82	4.20	0.31
						1" Ice	10.97	5.38	0.38
						2" Ice	15.27	7.74	0.51
						4" Ice	23.87	12.46	0.77
Side Arm Mount [SO 102-3]	C	None		0.0000	92.00	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
						2" Ice	4.92	4.92	0.20
						4" Ice	6.84	6.84	0.32
***									
***									
HORIZON DUO	A	From Leg	4.00	0.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			3.00			1" Ice	0.76	0.52	0.02
						2" Ice	1.00	0.73	0.04
						4" Ice	1.60	1.25	0.10
840 10045 w/ Mount Pipe	A	From Leg	4.00	0.0000	83.00	No Ice	4.63	4.63	0.06
			0.00			1/2" Ice	5.66	5.66	0.11
			-1.00			1" Ice	6.42	6.42	0.17
						2" Ice	7.97	7.97	0.30
						4" Ice	11.33	11.33	0.68
WIMAX DAP HEAD	A	From Leg	4.00	0.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			-1.00			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
HORIZON DUO	B	From Leg	4.00	0.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			3.00			1" Ice	0.76	0.52	0.02
						2" Ice	1.00	0.73	0.04
						4" Ice	1.60	1.25	0.10
840 10045 w/ Mount Pipe	B	From Leg	4.00	0.0000	83.00	No Ice	4.63	4.63	0.06
			0.00			1/2" Ice	5.66	5.66	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-1.00			1" Ice	6.42	6.42	0.17
						2" Ice	7.97	7.97	0.30
						4" Ice	11.33	11.33	0.68
WIMAX DAP HEAD	B	From Leg	4.00	0.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			-1.00			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
HORIZON DUO	C	From Leg	4.00	0.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			3.00			1" Ice	0.76	0.52	0.02
						2" Ice	1.00	0.73	0.04
						4" Ice	1.60	1.25	0.10
840 10045 w/ Mount Pipe	C	From Leg	4.00	0.0000	83.00	No Ice	4.63	4.63	0.06
			0.00			1/2" Ice	5.66	5.66	0.11
			-1.00			1" Ice	6.42	6.42	0.17
						2" Ice	7.97	7.97	0.30
						4" Ice	11.33	11.33	0.68
WIMAX DAP HEAD	C	From Leg	4.00	0.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			-1.00			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	83.00	No Ice	8.50	6.95	0.08
			0.00			1/2" Ice	9.15	8.13	0.15
			0.00			1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	83.00	No Ice	8.50	6.95	0.08
			0.00			1/2" Ice	9.15	8.13	0.15
			0.00			1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	83.00	No Ice	8.50	6.95	0.08
			0.00			1/2" Ice	9.15	8.13	0.15
			0.00			1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
Platform Mount [LP 404-1]	C	None		0.0000	83.00	No Ice	32.79	32.79	2.04
						1/2" Ice	44.63	44.63	2.48
						1" Ice	56.47	56.47	2.91
						2" Ice	80.15	80.15	3.77
						4" Ice	127.51	127.51	5.50
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	4.00	0.0000	81.00	No Ice	2.40	2.25	0.06
			0.00			1/2" Ice	2.61	2.46	0.09
			0.00			1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	4.00	0.0000	81.00	No Ice	2.40	2.25	0.06
			0.00			1/2" Ice	2.61	2.46	0.09
			0.00			1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00	0.0000	81.00	No Ice	2.71	2.61	0.06
			0.00			1/2" Ice	2.95	2.85	0.08
			0.00			1" Ice	3.20	3.09	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
800MHz 2X50W RRH W/FILTER	C	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 102-3]	C	None		0.0000	81.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
***									
DR65-18-00DPL2Q w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
ONEBASE TWIN DUAL DUPLEX TMA	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.67 0.79 0.91 1.18 1.82	0.31 0.39 0.49 0.70 1.23	0.01 0.02 0.02 0.04 0.10
APX16DWV-16DWV-S-E-A CU w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.10 0.16 0.28 0.65
APX16DWV-16DWV-S-E-A CU w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.10 0.16 0.28 0.65
DR65-18-00DPL2Q w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
ONEBASE TWIN DUAL DUPLEX TMA	B	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.67 0.79 0.91 1.18 1.82	0.31 0.39 0.49 0.70 1.23	0.01 0.02 0.02 0.04 0.10
ONEBASE TWIN DUAL DUPLEX TMA	C	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.67 0.79 0.91 1.18	0.31 0.39 0.49 0.70	0.01 0.02 0.02 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APX16DWV-16DWV-S-E-A CU w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	75.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.82 6.94 7.44 7.94 8.98 11.17	1.23 3.29 4.00 4.66 6.04 9.02	0.10 0.06 0.10 0.16 0.28 0.65
DR65-18-00DPL2Q w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.54 7.04 7.54 8.58 10.78	3.73 4.46 5.14 6.56 9.66	0.04 0.08 0.14 0.27 0.64
Platform Mount [LP 303-1]	C	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
***									
Lightning Rod 1/2"x4'	A	From Face	0.00 0.00 2.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.20 0.61 0.95 1.46 2.64	0.20 0.61 0.95 1.46 2.64	0.03 0.03 0.04 0.06 0.13
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-11G-4-C	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	0.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.08 14.63 15.19 16.31 18.55	0.12 0.20 0.27 0.42 0.72
A-ANT-11G-4-C	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	0.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.08 14.63 15.19 16.31 18.55	0.12 0.20 0.27 0.42 0.72
A-ANT-11G-4-C	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	0.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.08 14.63 15.19 16.31 18.55	0.12 0.20 0.27 0.42 0.72

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	96 - 85	Pole	Max Tension	8	0.00	-0.00	0.00
			Max. Compression	14	-4.78	0.03	0.15
			Max. Mx	11	-2.31	23.33	0.12
			Max. My	2	-2.31	0.02	22.84
			Max. Vy	11	-4.58	23.33	0.12
			Max. Vx	8	4.52	0.02	-22.83
			Max. Torque	5			0.94
L2	85 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.38	0.37	0.86
			Max. Mx	11	-10.47	213.17	2.23
			Max. My	8	-10.47	0.05	-211.37
			Max. Vy	11	-11.87	213.17	2.23
			Max. Vx	8	11.82	0.05	-211.37
			Max. Torque	5			1.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	65 - 32.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.49	1.48	1.95
			Max. Mx	11	-17.31	664.22	5.73
			Max. My	8	-17.31	0.15	-660.18
			Max. Vy	11	-15.77	664.22	5.73
			Max. Vx	8	15.71	0.15	-660.18
			Max. Torque	5			1.22
L4	32.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.43	2.51	2.99
			Max. Mx	11	-26.28	1231.90	9.20
			Max. My	8	-26.28	0.25	-1225.63
			Max. Vy	11	-19.13	1231.90	9.20
			Max. Vx	8	19.08	0.25	-1225.63
			Max. Torque	5			1.37

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	40.43	0.00	0.00
	Max. H_x	11	26.29	19.13	0.10
	Max. H_z	2	26.29	0.00	19.00
	Max. M_x	2	1221.61	0.00	19.00
	Max. M_z	5	1231.40	-19.13	0.10
	Max. Torsion	5	1.37	-19.13	0.10
	Min. Vert	8	26.29	0.00	-19.07
	Min. H_x	5	26.29	-19.13	0.10
	Min. H_z	8	26.29	0.00	-19.07
	Min. M_x	8	-1225.63	0.00	-19.07
	Min. M_z	11	-1231.90	19.13	0.10
	Min. Torsion	11	-1.37	19.13	0.10

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.29	0.00	-0.00	-0.95	0.25	0.00
Dead+Wind 0 deg - No Ice	26.29	-0.00	-19.00	-1221.61	0.25	-0.48
Dead+Wind 30 deg - No Ice	26.29	9.65	-16.46	-1058.26	-622.72	-0.06
Dead+Wind 60 deg - No Ice	26.29	16.57	-9.54	-614.28	-1067.27	-0.82
Dead+Wind 90 deg - No Ice	26.29	19.13	-0.10	-9.20	-1231.40	-1.37
Dead+Wind 120 deg - No Ice	26.29	16.51	9.50	609.40	-1062.14	-0.35
Dead+Wind 150 deg - No Ice	26.29	9.48	16.56	1064.59	-608.44	0.76
Dead+Wind 180 deg - No Ice	26.29	-0.00	19.07	1225.63	0.25	0.48
Dead+Wind 210 deg - No Ice	26.29	-9.48	16.56	1064.59	608.93	0.06
Dead+Wind 240 deg - No Ice	26.29	-16.51	9.50	609.40	1062.63	0.82
Dead+Wind 270 deg - No Ice	26.29	-19.13	-0.10	-9.20	1231.90	1.37
Dead+Wind 300 deg - No Ice	26.29	-16.57	-9.54	-614.28	1067.77	0.35
Dead+Wind 330 deg - No Ice	26.29	-9.65	-16.46	-1058.26	623.21	-0.76
Dead+Ice+Temp	40.43	-0.00	-0.00	-2.99	2.51	0.00
Dead+Wind 0 deg+Ice+Temp	40.43	0.00	-6.59	-410.79	2.54	-0.37

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 30 deg+Ice+Temp	40.43	3.33	-5.70	-356.20	-204.37	-0.33
Dead+Wind 60 deg+Ice+Temp	40.43	5.73	-3.30	-207.63	-353.06	-0.48
Dead+Wind 90 deg+Ice+Temp	40.43	6.62	-0.02	-5.02	-407.83	-0.51
Dead+Wind 120 deg+Ice+Temp	40.43	5.72	3.29	200.85	-351.82	-0.11
Dead+Wind 150 deg+Ice+Temp	40.43	3.29	5.73	352.13	-200.92	0.32
Dead+Wind 180 deg+Ice+Temp	40.43	0.00	6.60	406.17	2.54	0.37
Dead+Wind 210 deg+Ice+Temp	40.43	-3.29	5.73	352.13	206.00	0.33
Dead+Wind 240 deg+Ice+Temp	40.43	-5.72	3.29	200.85	356.91	0.48
Dead+Wind 270 deg+Ice+Temp	40.43	-6.62	-0.02	-5.02	412.92	0.51
Dead+Wind 300 deg+Ice+Temp	40.43	-5.73	-3.30	-207.63	358.15	0.11
Dead+Wind 330 deg+Ice+Temp	40.43	-3.33	-5.70	-356.20	209.46	-0.32
Dead+Wind 0 deg - Service	26.29	0.00	-7.43	-478.18	0.25	-0.19
Dead+Wind 30 deg - Service	26.29	3.77	-6.43	-414.30	-243.29	-0.02
Dead+Wind 60 deg - Service	26.29	6.48	-3.73	-240.73	-417.09	-0.32
Dead+Wind 90 deg - Service	26.29	7.48	-0.04	-4.18	-481.26	-0.53
Dead+Wind 120 deg - Service	26.29	6.45	3.71	237.66	-415.08	-0.14
Dead+Wind 150 deg - Service	26.29	3.71	6.47	415.61	-237.71	0.30
Dead+Wind 180 deg - Service	26.29	0.00	7.45	478.59	0.25	0.19
Dead+Wind 210 deg - Service	26.29	-3.71	6.47	415.61	238.21	0.02
Dead+Wind 240 deg - Service	26.29	-6.45	3.71	237.66	415.58	0.32
Dead+Wind 270 deg - Service	26.29	-7.48	-0.04	-4.18	481.75	0.53
Dead+Wind 300 deg - Service	26.29	-6.48	-3.73	-240.73	417.58	0.14
Dead+Wind 330 deg - Service	26.29	-3.77	-6.43	-414.30	243.79	-0.30

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-26.29	0.00	0.00	26.29	0.00	0.000%
2	0.00	-26.29	-19.01	0.00	26.29	19.00	0.003%
3	9.65	-26.29	-16.46	-9.65	26.29	16.46	0.001%
4	16.57	-26.29	-9.54	-16.57	26.29	9.54	0.001%
5	19.13	-26.29	-0.10	-19.13	26.29	0.10	0.001%
6	16.52	-26.29	9.50	-16.51	26.29	-9.50	0.001%
7	9.48	-26.29	16.56	-9.48	26.29	-16.56	0.001%
8	0.00	-26.29	19.07	0.00	26.29	-19.07	0.003%
9	-9.48	-26.29	16.56	9.48	26.29	-16.56	0.001%
10	-16.52	-26.29	9.50	16.51	26.29	-9.50	0.001%
11	-19.13	-26.29	-0.10	19.13	26.29	0.10	0.001%
12	-16.57	-26.29	-9.54	16.57	26.29	9.54	0.001%
13	-9.65	-26.29	-16.46	9.65	26.29	16.46	0.001%
14	0.00	-40.43	0.00	0.00	40.43	0.00	0.000%
15	0.00	-40.43	-6.59	-0.00	40.43	6.59	0.000%
16	3.33	-40.43	-5.70	-3.33	40.43	5.70	0.000%
17	5.73	-40.43	-3.30	-5.73	40.43	3.30	0.000%
18	6.62	-40.43	-0.02	-6.62	40.43	0.02	0.000%
19	5.72	-40.43	3.29	-5.72	40.43	-3.29	0.000%
20	3.29	-40.43	5.73	-3.29	40.43	-5.73	0.000%
21	0.00	-40.43	6.60	-0.00	40.43	-6.60	0.000%
22	-3.29	-40.43	5.73	3.29	40.43	-5.73	0.000%
23	-5.72	-40.43	3.29	5.72	40.43	-3.29	0.000%
24	-6.62	-40.43	-0.02	6.62	40.43	0.02	0.000%
25	-5.73	-40.43	-3.30	5.73	40.43	3.30	0.000%
26	-3.33	-40.43	-5.70	3.33	40.43	5.70	0.000%
27	0.00	-26.29	-7.43	-0.00	26.29	7.43	0.001%
28	3.77	-26.29	-6.43	-3.77	26.29	6.43	0.001%
29	6.48	-26.29	-3.73	-6.48	26.29	3.73	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
30	7.48	-26.29	-0.04	-7.48	26.29	0.04	0.001%
31	6.46	-26.29	3.71	-6.45	26.29	-3.71	0.001%
32	3.71	-26.29	6.47	-3.71	26.29	-6.47	0.001%
33	0.00	-26.29	7.45	-0.00	26.29	-7.45	0.001%
34	-3.71	-26.29	6.47	3.71	26.29	-6.47	0.001%
35	-6.46	-26.29	3.71	6.45	26.29	-3.71	0.001%
36	-7.48	-26.29	-0.04	7.48	26.29	0.04	0.001%
37	-6.48	-26.29	-3.73	6.48	26.29	3.73	0.001%
38	-3.77	-26.29	-6.43	3.77	26.29	6.43	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	8	0.00000001	0.00011704
3	Yes	9	0.00000001	0.00009840
4	Yes	9	0.00000001	0.00010629
5	Yes	9	0.00000001	0.00005845
6	Yes	9	0.00000001	0.00008397
7	Yes	9	0.00000001	0.00007896
8	Yes	8	0.00000001	0.00011722
9	Yes	9	0.00000001	0.00008512
10	Yes	9	0.00000001	0.00008042
11	Yes	9	0.00000001	0.00005848
12	Yes	9	0.00000001	0.00009984
13	Yes	9	0.00000001	0.00010960
14	Yes	6	0.00000001	0.00000001
15	Yes	10	0.00000001	0.00005973
16	Yes	10	0.00000001	0.00006069
17	Yes	10	0.00000001	0.00006056
18	Yes	10	0.00000001	0.00005927
19	Yes	10	0.00000001	0.00005971
20	Yes	10	0.00000001	0.00005974
21	Yes	10	0.00000001	0.00005892
22	Yes	10	0.00000001	0.00006019
23	Yes	10	0.00000001	0.00006042
24	Yes	10	0.00000001	0.00006006
25	Yes	10	0.00000001	0.00006124
26	Yes	10	0.00000001	0.00006115
27	Yes	8	0.00000001	0.00005606
28	Yes	8	0.00000001	0.00005317
29	Yes	8	0.00000001	0.00005617
30	Yes	8	0.00000001	0.00006394
31	Yes	8	0.00000001	0.00005019
32	Yes	8	0.00000001	0.00005042
33	Yes	8	0.00000001	0.00005608
34	Yes	8	0.00000001	0.00005036
35	Yes	8	0.00000001	0.00005018
36	Yes	8	0.00000001	0.00006401
37	Yes	8	0.00000001	0.00005390
38	Yes	8	0.00000001	0.00005728

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	3.930	37	0.3054	0.0019
L2	85 - 65	3.239	37	0.2812	0.0009
L3	65 - 32.5	2.093	37	0.2588	0.0006
L4	32.5 - 0	0.605	37	0.1614	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
96.00	Lightning Rod 1/2"x4'	37	3.930	0.3054	0.0019	54971
92.00	7770.00 w/ Mount Pipe	37	3.676	0.2957	0.0015	54971
86.00	A-ANT-11G-4-C	37	3.300	0.2830	0.0010	29142
83.00	HORIZON DUO	37	3.117	0.2781	0.0008	27227
81.00	800MHz 2X50W RRH W/FILTER	37	2.998	0.2755	0.0007	28451
75.00	DR65-18-00DPL2Q w/ Mount Pipe	37	2.649	0.2694	0.0006	35817

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	10.042	11	0.7800	0.0048
L2	85 - 65	8.276	11	0.7185	0.0023
L3	65 - 32.5	5.349	11	0.6614	0.0016
L4	32.5 - 0	1.546	11	0.4125	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
96.00	Lightning Rod 1/2"x4'	11	10.042	0.7800	0.0048	21579
92.00	7770.00 w/ Mount Pipe	11	9.392	0.7554	0.0037	21579
86.00	A-ANT-11G-4-C	11	8.433	0.7230	0.0024	11439
83.00	HORIZON DUO	11	7.966	0.7107	0.0020	10686
81.00	800MHz 2X50W RRH W/FILTER	11	7.661	0.7040	0.0018	11165
75.00	DR65-18-00DPL2Q w/ Mount Pipe	11	6.770	0.6883	0.0015	14045

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	96 - 95	P12x.5	11.00	0.00	0.0	21.000	19.2423	-0.13	404.09	0.000
	95 - 94					21.000	19.2423	-0.17	404.09	0.000
	94 - 93					21.000	19.2423	-0.24	404.09	0.001
	93 - 92					21.000	19.2423	-0.31	404.09	0.001
	92 - 91					21.000	19.2423	-1.55	404.09	0.004
	91 - 90					21.000	19.2423	-1.62	404.09	0.004
	90 - 89					21.000	19.2423	-1.69	404.09	0.004
	89 - 88					21.000	19.2423	-1.76	404.09	0.004
	88 - 87					21.000	19.2423	-1.83	404.09	0.005
	87 - 86					21.000	19.2423	-1.90	404.09	0.005
	86 - 85					21.000	19.2423	-2.31	404.09	0.006
L2	85 - 84	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-2.49	1113.69	0.002
	84 - 83					22.711	49.0383	-2.67	1113.69	0.002
	83 - 82					22.711	49.0383	-5.39	1113.69	0.005
	82 - 81					22.711	49.0383	-5.58	1113.69	0.005
	81 - 80					22.711	49.0383	-6.19	1113.69	0.006
	80 - 79					22.711	49.0383	-6.37	1113.69	0.006
	79 - 78					22.711	49.0383	-6.55	1113.69	0.006
	78 - 77					22.711	49.0383	-6.73	1113.69	0.006
	77 - 76					22.711	49.0383	-6.91	1113.69	0.006
	76 - 75					22.711	49.0383	-7.09	1113.69	0.006
	75 - 74					22.711	49.0383	-8.84	1113.69	0.008
	74 - 73					22.711	49.0383	-9.02	1113.69	0.008
	73 - 72					22.711	49.0383	-9.20	1113.69	0.008
	72 - 71					22.711	49.0383	-9.38	1113.69	0.008
	71 - 70					22.711	49.0383	-9.56	1113.69	0.009
	70 - 69					22.711	49.0383	-9.74	1113.69	0.009
	69 - 68					22.711	49.0383	-9.93	1113.69	0.009
	68 - 67					22.711	49.0383	-10.11	1113.69	0.009
	67 - 66					22.711	49.0383	-10.29	1113.69	0.009
	66 - 65					22.711	49.0383	-10.47	1113.69	0.009
L3	65 - 63.375	P48x3/8	32.50	0.00	0.0	21.972	56.1069	-10.81	1232.77	0.009
	63.375 - 61.75					21.972	56.1069	-11.15	1232.77	0.009
	61.75 - 60.125					21.972	56.1069	-11.49	1232.77	0.009
	60.125 - 58.5					21.972	56.1069	-11.83	1232.77	0.010
	58.5 - 56.875					21.972	56.1069	-12.17	1232.77	0.010
	56.875 - 55.25					21.972	56.1069	-12.51	1232.77	0.010
	55.25 - 53.625					21.972	56.1069	-12.85	1232.77	0.010
	53.625 - 52					21.972	56.1069	-13.19	1232.77	0.011
	52 - 50.375					21.972	56.1069	-13.54	1232.77	0.011
	50.375 - 48.75					21.972	56.1069	-13.88	1232.77	0.011
	48.75 - 47.125					21.972	56.1069	-14.22	1232.77	0.012
	47.125 - 45.5					21.972	56.1069	-14.56	1232.77	0.012
	45.5 - 43.875					21.972	56.1069	-14.90	1232.77	0.012
	43.875 - 42.25					21.972	56.1069	-15.25	1232.77	0.012
	42.25 - 40.625					21.972	56.1069	-15.59	1232.77	0.013
	40.625 - 39					21.972	56.1069	-15.93	1232.77	0.013
	39 - 37.375					21.972	56.1069	-16.28	1232.77	0.013
	37.375 - 35.75					21.972	56.1069	-16.62	1232.77	0.013
	35.75 - 34.125					21.972	56.1069	-16.96	1232.77	0.014
	34.125 - 32.5					21.972	56.1069	-17.31	1232.77	0.014
L4	32.5 - 30.875	P48x1/2	32.50	0.00	0.0	23.696	74.6128	-17.76	1768.01	0.010
	30.875 - 29.25					23.696	74.6128	-18.20	1768.01	0.010
	29.25 - 27.625					23.696	74.6128	-18.65	1768.01	0.011
	27.625 - 26					23.696	74.6128	-19.09	1768.01	0.011
	26 - 24.375					23.696	74.6128	-19.54	1768.01	0.011

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	24.375 - 22.75					23.696	74.6128	-19.99	1768.01	0.011
	22.75 - 21.125					23.696	74.6128	-20.44	1768.01	0.012
	21.125 - 19.5					23.696	74.6128	-20.88	1768.01	0.012
	19.5 - 17.875					23.696	74.6128	-21.33	1768.01	0.012
	17.875 - 16.25					23.696	74.6128	-21.78	1768.01	0.012
	16.25 - 14.625					23.696	74.6128	-22.23	1768.01	0.013
	14.625 - 13					23.696	74.6128	-22.68	1768.01	0.013
	13 - 11.375					23.696	74.6128	-23.13	1768.01	0.013
	11.375 - 9.75					23.696	74.6128	-23.58	1768.01	0.013
	9.75 - 8.125					23.696	74.6128	-24.03	1768.01	0.014
	8.125 - 6.5					23.696	74.6128	-24.48	1768.01	0.014
	6.5 - 4.875					23.696	74.6128	-24.93	1768.01	0.014
	4.875 - 3.25					23.696	74.6128	-25.38	1768.01	0.014
	3.25 - 1.625					23.696	74.6128	-25.83	1768.01	0.015
	1.625 - 0					23.696	74.6128	-26.28	1768.01	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	96 - 95	P12x.5	0.05	0.011	23.100	0.000	0.00	0.000	23.100	0.000
	95 - 94		0.10	0.021	23.100	0.001	0.00	0.000	23.100	0.000
	94 - 93		0.17	0.036	23.100	0.002	0.00	0.000	23.100	0.000
	93 - 92		0.27	0.056	23.100	0.002	0.00	0.000	23.100	0.000
	92 - 91		3.29	0.695	23.100	0.030	0.00	0.000	23.100	0.000
	91 - 90		6.33	1.340	23.100	0.058	0.00	0.000	23.100	0.000
	90 - 89		9.40	1.989	23.100	0.086	0.00	0.000	23.100	0.000
	89 - 88		12.50	2.645	23.100	0.114	0.00	0.000	23.100	0.000
	88 - 87		15.62	3.305	23.100	0.143	0.00	0.000	23.100	0.000
	87 - 86		18.77	3.971	23.100	0.172	0.00	0.000	23.100	0.000
	86 - 85		23.33	4.936	23.100	0.214	0.00	0.000	23.100	0.000
L2	85 - 84	P42x3/8	27.96	0.663	22.711	0.029	0.00	0.000	22.711	0.000
	84 - 83		32.71	0.776	22.711	0.034	0.00	0.000	22.711	0.000
	83 - 82		39.82	0.945	22.711	0.042	0.00	0.000	22.711	0.000
	82 - 81		47.53	1.128	22.711	0.050	0.00	0.000	22.711	0.000
	81 - 80		56.00	1.329	22.711	0.058	0.00	0.000	22.711	0.000
	80 - 79		64.58	1.532	22.711	0.067	0.00	0.000	22.711	0.000
	79 - 78		73.27	1.738	22.711	0.077	0.00	0.000	22.711	0.000
	78 - 77		82.08	1.947	22.711	0.086	0.00	0.000	22.711	0.000
	77 - 76		91.00	2.159	22.711	0.095	0.00	0.000	22.711	0.000
	76 - 75		100.04	2.373	22.711	0.105	0.00	0.000	22.711	0.000
	75 - 74		110.85	2.630	22.711	0.116	0.00	0.000	22.711	0.000
	74 - 73		121.77	2.889	22.711	0.127	0.00	0.000	22.711	0.000
	73 - 72		132.80	3.151	22.711	0.139	0.00	0.000	22.711	0.000
	72 - 71		143.95	3.415	22.711	0.150	0.00	0.000	22.711	0.000
	71 - 70		155.20	3.682	22.711	0.162	0.00	0.000	22.711	0.000
	70 - 69		166.57	3.952	22.711	0.174	0.00	0.000	22.711	0.000
	69 - 68		178.06	4.224	22.711	0.186	0.00	0.000	22.711	0.000
	68 - 67		189.65	4.500	22.711	0.198	0.00	0.000	22.711	0.000
	67 - 66		201.36	4.777	22.711	0.210	0.00	0.000	22.711	0.000
	66 - 65		213.18	5.058	22.711	0.223	0.00	0.000	22.711	0.000
L3	65 - 63.375	P48x3/8	232.65	4.212	21.972	0.192	0.00	0.000	21.972	0.000
	63.375 - 61.75		252.46	4.570	21.972	0.208	0.00	0.000	21.972	0.000
	61.75 - 60.125		272.61	4.935	21.972	0.225	0.00	0.000	21.972	0.000
	60.125 - 58.5		293.09	5.306	21.972	0.241	0.00	0.000	21.972	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	58.5 - 56.875		313.91	5.683	21.972	0.259	0.00	0.000	21.972	0.000
	56.875 - 55.25		335.06	6.066	21.972	0.276	0.00	0.000	21.972	0.000
	55.25 - 53.625		356.53	6.455	21.972	0.294	0.00	0.000	21.972	0.000
	53.625 - 52		378.33	6.849	21.972	0.312	0.00	0.000	21.972	0.000
	52 - 50.375		400.45	7.250	21.972	0.330	0.00	0.000	21.972	0.000
	50.375 - 48.75		422.89	7.656	21.972	0.348	0.00	0.000	21.972	0.000
	48.75 - 47.125		445.65	8.068	21.972	0.367	0.00	0.000	21.972	0.000
	47.125 - 45.5		468.72	8.486	21.972	0.386	0.00	0.000	21.972	0.000
	45.5 - 43.875		492.11	8.909	21.972	0.405	0.00	0.000	21.972	0.000
	43.875 - 42.25		515.79	9.338	21.972	0.425	0.00	0.000	21.972	0.000
	42.25 - 40.625		539.79	9.772	21.972	0.445	0.00	0.000	21.972	0.000
	40.625 - 39		564.09	10.212	21.972	0.465	0.00	0.000	21.972	0.000
	39 - 37.375		588.69	10.657	21.972	0.485	0.00	0.000	21.972	0.000
	37.375 - 35.75		613.58	11.108	21.972	0.506	0.00	0.000	21.972	0.000
	35.75 - 34.125		638.77	11.564	21.972	0.526	0.00	0.000	21.972	0.000
	34.125 - 32.5		664.24	12.025	21.972	0.547	0.00	0.000	21.972	0.000
L4	32.5 - 30.875	P48x1/2	690.01	9.443	23.696	0.398	0.00	0.000	23.696	0.000
	30.875 - 29.25		716.05	9.799	23.696	0.414	0.00	0.000	23.696	0.000
	29.25 - 27.625		742.37	10.159	23.696	0.429	0.00	0.000	23.696	0.000
	27.625 - 26		768.98	10.523	23.696	0.444	0.00	0.000	23.696	0.000
	26 - 24.375		795.86	10.891	23.696	0.460	0.00	0.000	23.696	0.000
	24.375 - 22.75		823.02	11.263	23.696	0.475	0.00	0.000	23.696	0.000
	22.75 - 21.125		850.46	11.638	23.696	0.491	0.00	0.000	23.696	0.000
	21.125 - 19.5		878.17	12.017	23.696	0.507	0.00	0.000	23.696	0.000
	19.5 - 17.875		906.16	12.400	23.696	0.523	0.00	0.000	23.696	0.000
	17.875 - 16.25		934.42	12.787	23.696	0.540	0.00	0.000	23.696	0.000
	16.25 - 14.625		962.95	13.178	23.696	0.556	0.00	0.000	23.696	0.000
	14.625 - 13		991.77	13.572	23.696	0.573	0.00	0.000	23.696	0.000
	13 - 11.375		1020.84	13.970	23.696	0.590	0.00	0.000	23.696	0.000
	11.375 - 9.75		1050.19	14.371	23.696	0.607	0.00	0.000	23.696	0.000
	9.75 - 8.125		1079.82	14.777	23.696	0.624	0.00	0.000	23.696	0.000
	8.125 - 6.5		1109.71	15.186	23.696	0.641	0.00	0.000	23.696	0.000
	6.5 - 4.875		1139.87	15.599	23.696	0.658	0.00	0.000	23.696	0.000
	4.875 - 3.25		1170.29	16.015	23.696	0.676	0.00	0.000	23.696	0.000
	3.25 - 1.625		1200.97	16.435	23.696	0.694	0.00	0.000	23.696	0.000
	1.625 - 0		1231.93	16.859	23.696	0.711	0.00	0.000	23.696	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	96 - 95	P12x.5	0.02	0.002	14.000	0.000	0.00	0.000	14.000	0.000
	95 - 94		0.06	0.006	14.000	0.000	0.00	0.000	14.000	0.000
	94 - 93		0.08	0.009	14.000	0.001	0.00	0.000	14.000	0.000
	93 - 92		0.11	0.011	14.000	0.001	0.00	0.000	14.000	0.000
	92 - 91		3.03	0.315	14.000	0.023	0.25	0.026	14.000	0.002
	91 - 90		3.06	0.318	14.000	0.023	0.25	0.026	14.000	0.002
	90 - 89		3.08	0.321	14.000	0.023	0.25	0.026	14.000	0.002
	89 - 88		3.11	0.323	14.000	0.023	0.25	0.026	14.000	0.002
	88 - 87		3.13	0.326	14.000	0.023	0.25	0.026	14.000	0.002
	87 - 86		3.16	0.328	14.000	0.023	0.25	0.026	14.000	0.002
	86 - 85		4.58	0.476	14.000	0.034	0.94	0.099	14.000	0.007
L2	85 - 84	P42x3/8	4.69	0.191	16.800	0.011	0.94	0.011	12.473	0.001
	84 - 83		4.80	0.196	16.800	0.012	0.95	0.011	12.473	0.001
	83 - 82		7.65	0.312	16.800	0.019	0.96	0.011	12.473	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	82 - 81		7.76	0.317	16.800	0.019	0.96	0.011	12.473	0.001
	81 - 80		8.53	0.348	16.800	0.021	0.97	0.011	12.473	0.001
	80 - 79		8.64	0.352	16.800	0.021	0.97	0.012	12.473	0.001
	79 - 78		8.75	0.357	16.800	0.021	0.98	0.012	12.473	0.001
	78 - 77		8.86	0.362	16.800	0.022	0.98	0.012	12.473	0.001
	77 - 76		8.98	0.366	16.800	0.022	0.99	0.012	12.473	0.001
	76 - 75		9.09	0.371	16.800	0.022	1.00	0.012	12.473	0.001
	75 - 74		10.86	0.443	16.800	0.026	1.00	0.012	12.473	0.001
	74 - 73		10.98	0.448	16.800	0.027	1.01	0.012	12.473	0.001
	73 - 72		11.09	0.452	16.800	0.027	1.01	0.012	12.473	0.001
	72 - 71		11.20	0.457	16.800	0.027	1.02	0.012	12.473	0.001
	71 - 70		11.31	0.461	16.800	0.027	1.03	0.012	12.473	0.001
	70 - 69		11.43	0.466	16.800	0.028	1.03	0.012	12.473	0.001
	69 - 68		11.54	0.471	16.800	0.028	1.04	0.012	12.473	0.001
	68 - 67		11.65	0.475	16.800	0.028	1.04	0.012	12.473	0.001
	67 - 66		11.76	0.480	16.800	0.029	1.05	0.012	12.473	0.001
	66 - 65		11.87	0.484	16.800	0.029	1.05	0.013	12.473	0.001
L3	65 - 63.375	P48x3/8	12.08	0.431	16.800	0.026	1.06	0.010	11.284	0.001
	63.375 - 61.75		12.29	0.438	16.800	0.026	1.07	0.010	11.284	0.001
	61.75 - 60.125		12.50	0.446	16.800	0.027	1.08	0.010	11.284	0.001
	60.125 - 58.5		12.71	0.453	16.800	0.027	1.09	0.010	11.284	0.001
	58.5 - 56.875		12.91	0.460	16.800	0.027	1.10	0.010	11.284	0.001
	56.875 - 55.25		13.11	0.467	16.800	0.028	1.11	0.010	11.284	0.001
	55.25 - 53.625		13.31	0.475	16.800	0.028	1.11	0.010	11.284	0.001
	53.625 - 52		13.51	0.482	16.800	0.029	1.12	0.010	11.284	0.001
	52 - 50.375		13.71	0.489	16.800	0.029	1.13	0.010	11.284	0.001
	50.375 - 48.75		13.91	0.496	16.800	0.030	1.14	0.010	11.284	0.001
	48.75 - 47.125		14.10	0.503	16.800	0.030	1.15	0.010	11.284	0.001
	47.125 - 45.5		14.29	0.509	16.800	0.030	1.16	0.010	11.284	0.001
	45.5 - 43.875		14.48	0.516	16.800	0.031	1.16	0.011	11.284	0.001
	43.875 - 42.25		14.67	0.523	16.800	0.031	1.17	0.011	11.284	0.001
	42.25 - 40.625		14.86	0.530	16.800	0.032	1.18	0.011	11.284	0.001
	40.625 - 39		15.04	0.536	16.800	0.032	1.19	0.011	11.284	0.001
	39 - 37.375		15.23	0.543	16.800	0.032	1.20	0.011	11.284	0.001
	37.375 - 35.75		15.41	0.549	16.800	0.033	1.20	0.011	11.284	0.001
	35.75 - 34.125		15.59	0.556	16.800	0.033	1.21	0.011	11.284	0.001
	34.125 - 32.5		15.77	0.562	16.800	0.033	1.22	0.011	11.284	0.001
L4	32.5 - 30.875	P48x1/2	15.94	0.427	16.800	0.025	1.23	0.008	16.167	0.001
	30.875 - 29.25		16.11	0.432	16.800	0.026	1.23	0.008	16.167	0.001
	29.25 - 27.625		16.28	0.437	16.800	0.026	1.24	0.008	16.167	0.001
	27.625 - 26		16.46	0.441	16.800	0.026	1.25	0.009	16.167	0.001
	26 - 24.375		16.63	0.446	16.800	0.027	1.26	0.009	16.167	0.001
	24.375 - 22.75		16.80	0.450	16.800	0.027	1.26	0.009	16.167	0.001
	22.75 - 21.125		16.97	0.455	16.800	0.027	1.27	0.009	16.167	0.001
	21.125 - 19.5		17.14	0.459	16.800	0.027	1.28	0.009	16.167	0.001
	19.5 - 17.875		17.31	0.464	16.800	0.028	1.29	0.009	16.167	0.001
	17.875 - 16.25		17.48	0.468	16.800	0.028	1.29	0.009	16.167	0.001
	16.25 - 14.625		17.65	0.473	16.800	0.028	1.30	0.009	16.167	0.001
	14.625 - 13		17.81	0.477	16.800	0.028	1.31	0.009	16.167	0.001
	13 - 11.375		17.98	0.482	16.800	0.029	1.32	0.009	16.167	0.001
	11.375 - 9.75		18.15	0.486	16.800	0.029	1.32	0.009	16.167	0.001
	9.75 - 8.125		18.31	0.491	16.800	0.029	1.33	0.009	16.167	0.001
	8.125 - 6.5		18.48	0.495	16.800	0.029	1.34	0.009	16.167	0.001
	6.5 - 4.875		18.64	0.500	16.800	0.030	1.35	0.009	16.167	0.001
	4.875 - 3.25		18.81	0.504	16.800	0.030	1.35	0.009	16.167	0.001
	3.25 - 1.625		18.97	0.509	16.800	0.030	1.36	0.009	16.167	0.001
	1.625 - 0		19.13	0.513	16.800	0.031	1.37	0.009	16.167	0.001

tnxTower	Job	Page
	Hayden Station, BU# 876326	18 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	**Project** 12-04546E S3	**Date** 13:59:18 10/26/12
	Client Crown Castle	**Designed by** Jeff Theberge

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	96 - 95	0.000	0.000	0.000	0.000	0.000	0.001 ✔	1.333	H1-3+VT ✔
	95 - 94	0.000	0.001	0.000	0.000	0.000	0.001 ✔	1.333	H1-3+VT ✔
	94 - 93	0.001	0.002	0.000	0.001	0.000	0.002 ✔	1.333	H1-3+VT ✔
	93 - 92	0.001	0.002	0.000	0.001	0.000	0.003 ✔	1.333	H1-3+VT ✔
	92 - 91	0.004	0.030	0.000	0.023	0.002	0.035 ✔	1.333	H1-3+VT ✔
	91 - 90	0.004	0.058	0.000	0.023	0.002	0.063 ✔	1.333	H1-3+VT ✔
	90 - 89	0.004	0.086	0.000	0.023	0.002	0.091 ✔	1.333	H1-3+VT ✔
	89 - 88	0.004	0.114	0.000	0.023	0.002	0.119 ✔	1.333	H1-3+VT ✔
	88 - 87	0.005	0.143	0.000	0.023	0.002	0.148 ✔	1.333	H1-3+VT ✔
	87 - 86	0.005	0.172	0.000	0.023	0.002	0.177 ✔	1.333	H1-3+VT ✔
	86 - 85	0.006	0.214	0.000	0.034	0.007	0.221 ✔	1.333	H1-3+VT ✔
L2	85 - 84	0.002	0.029	0.000	0.011	0.001	0.032 ✔	1.333	H1-3+VT ✔
	84 - 83	0.002	0.034	0.000	0.012	0.001	0.037 ✔	1.333	H1-3+VT ✔
	83 - 82	0.005	0.042	0.000	0.019	0.001	0.047 ✔	1.333	H1-3+VT ✔
	82 - 81	0.005	0.050	0.000	0.019	0.001	0.055 ✔	1.333	H1-3+VT ✔
	81 - 80	0.006	0.058	0.000	0.021	0.001	0.065 ✔	1.333	H1-3+VT ✔
	80 - 79	0.006	0.067	0.000	0.021	0.001	0.074 ✔	1.333	H1-3+VT ✔
	79 - 78	0.006	0.077	0.000	0.021	0.001	0.083 ✔	1.333	H1-3+VT ✔
	78 - 77	0.006	0.086	0.000	0.022	0.001	0.092 ✔	1.333	H1-3+VT ✔
	77 - 76	0.006	0.095	0.000	0.022	0.001	0.102 ✔	1.333	H1-3+VT ✔
	76 - 75	0.006	0.105	0.000	0.022	0.001	0.111 ✔	1.333	H1-3+VT ✔
	75 - 74	0.008	0.116	0.000	0.026	0.001	0.124 ✔	1.333	H1-3+VT ✔
	74 - 73	0.008	0.127	0.000	0.027	0.001	0.136 ✔	1.333	H1-3+VT ✔
	73 - 72	0.008	0.139	0.000	0.027	0.001	0.148 ✔	1.333	H1-3+VT ✔

tnxTower	Job: Hayden Station, BU# 876326	Page: 19 of 21
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	Project: 12-04546E S3	Date: 13:59:18 10/26/12
	Client: Crown Castle	Designed by: Jeff Theberge

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	72 - 71	0.008	0.150	0.000	0.027	0.001	0.160 ✔	1.333	H1-3+VT ✔
	71 - 70	0.009	0.162	0.000	0.027	0.001	0.172 ✔	1.333	H1-3+VT ✔
	70 - 69	0.009	0.174	0.000	0.028	0.001	0.184 ✔	1.333	H1-3+VT ✔
	69 - 68	0.009	0.186	0.000	0.028	0.001	0.196 ✔	1.333	H1-3+VT ✔
	68 - 67	0.009	0.198	0.000	0.028	0.001	0.208 ✔	1.333	H1-3+VT ✔
	67 - 66	0.009	0.210	0.000	0.029	0.001	0.220 ✔	1.333	H1-3+VT ✔
	66 - 65	0.009	0.223	0.000	0.029	0.001	0.233 ✔	1.333	H1-3+VT ✔
L3	65 - 63.375	0.009	0.192	0.000	0.026	0.001	0.201 ✔	1.333	H1-3+VT ✔
	63.375 - 61.75	0.009	0.208	0.000	0.026	0.001	0.218 ✔	1.333	H1-3+VT ✔
	61.75 - 60.125	0.009	0.225	0.000	0.027	0.001	0.235 ✔	1.333	H1-3+VT ✔
	60.125 - 58.5	0.010	0.241	0.000	0.027	0.001	0.252 ✔	1.333	H1-3+VT ✔
	58.5 - 56.875	0.010	0.259	0.000	0.027	0.001	0.269 ✔	1.333	H1-3+VT ✔
	56.875 - 55.25	0.010	0.276	0.000	0.028	0.001	0.287 ✔	1.333	H1-3+VT ✔
	55.25 - 53.625	0.010	0.294	0.000	0.028	0.001	0.305 ✔	1.333	H1-3+VT ✔
	53.625 - 52	0.011	0.312	0.000	0.029	0.001	0.323 ✔	1.333	H1-3+VT ✔
	52 - 50.375	0.011	0.330	0.000	0.029	0.001	0.342 ✔	1.333	H1-3+VT ✔
	50.375 - 48.75	0.011	0.348	0.000	0.030	0.001	0.361 ✔	1.333	H1-3+VT ✔
	48.75 - 47.125	0.012	0.367	0.000	0.030	0.001	0.380 ✔	1.333	H1-3+VT ✔
	47.125 - 45.5	0.012	0.386	0.000	0.030	0.001	0.399 ✔	1.333	H1-3+VT ✔
	45.5 - 43.875	0.012	0.405	0.000	0.031	0.001	0.419 ✔	1.333	H1-3+VT ✔
	43.875 - 42.25	0.012	0.425	0.000	0.031	0.001	0.438 ✔	1.333	H1-3+VT ✔
	42.25 - 40.625	0.013	0.445	0.000	0.032	0.001	0.458 ✔	1.333	H1-3+VT ✔
	40.625 - 39	0.013	0.465	0.000	0.032	0.001	0.479 ✔	1.333	H1-3+VT ✔
	39 - 37.375	0.013	0.485	0.000	0.032	0.001	0.499 ✔	1.333	H1-3+VT ✔
	37.375 - 35.75	0.013	0.506	0.000	0.033	0.001	0.520 ✔	1.333	H1-3+VT ✔
	35.75 - 34.125	0.014	0.526	0.000	0.033	0.001	0.541 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	34.125 - 32.5	0.014	0.547	0.000	0.033	0.001	0.563 ✔	1.333	H1-3+VT ✔
L4	32.5 - 30.875	0.010	0.398	0.000	0.025	0.001	0.409 ✔	1.333	H1-3+VT ✔
	30.875 - 29.25	0.010	0.414	0.000	0.026	0.001	0.425 ✔	1.333	H1-3+VT ✔
	29.25 - 27.625	0.011	0.429	0.000	0.026	0.001	0.440 ✔	1.333	H1-3+VT ✔
	27.625 - 26	0.011	0.444	0.000	0.026	0.001	0.456 ✔	1.333	H1-3+VT ✔
	26 - 24.375	0.011	0.460	0.000	0.027	0.001	0.471 ✔	1.333	H1-3+VT ✔
	24.375 - 22.75	0.011	0.475	0.000	0.027	0.001	0.487 ✔	1.333	H1-3+VT ✔
	22.75 - 21.125	0.012	0.491	0.000	0.027	0.001	0.503 ✔	1.333	H1-3+VT ✔
	21.125 - 19.5	0.012	0.507	0.000	0.027	0.001	0.520 ✔	1.333	H1-3+VT ✔
	19.5 - 17.875	0.012	0.523	0.000	0.028	0.001	0.536 ✔	1.333	H1-3+VT ✔
	17.875 - 16.25	0.012	0.540	0.000	0.028	0.001	0.553 ✔	1.333	H1-3+VT ✔
	16.25 - 14.625	0.013	0.556	0.000	0.028	0.001	0.570 ✔	1.333	H1-3+VT ✔
	14.625 - 13	0.013	0.573	0.000	0.028	0.001	0.586 ✔	1.333	H1-3+VT ✔
	13 - 11.375	0.013	0.590	0.000	0.029	0.001	0.603 ✔	1.333	H1-3+VT ✔
	11.375 - 9.75	0.013	0.607	0.000	0.029	0.001	0.621 ✔	1.333	H1-3+VT ✔
	9.75 - 8.125	0.014	0.624	0.000	0.029	0.001	0.638 ✔	1.333	H1-3+VT ✔
	8.125 - 6.5	0.014	0.641	0.000	0.029	0.001	0.656 ✔	1.333	H1-3+VT ✔
	6.5 - 4.875	0.014	0.658	0.000	0.030	0.001	0.673 ✔	1.333	H1-3+VT ✔
	4.875 - 3.25	0.014	0.676	0.000	0.030	0.001	0.691 ✔	1.333	H1-3+VT ✔
	3.25 - 1.625	0.015	0.694	0.000	0.030	0.001	0.709 ✔	1.333	H1-3+VT ✔
	1.625 - 0	0.015	0.711	0.000	0.031	0.001	0.727 ✔	1.333	H1-3+VT ✔

Section Capacity Table

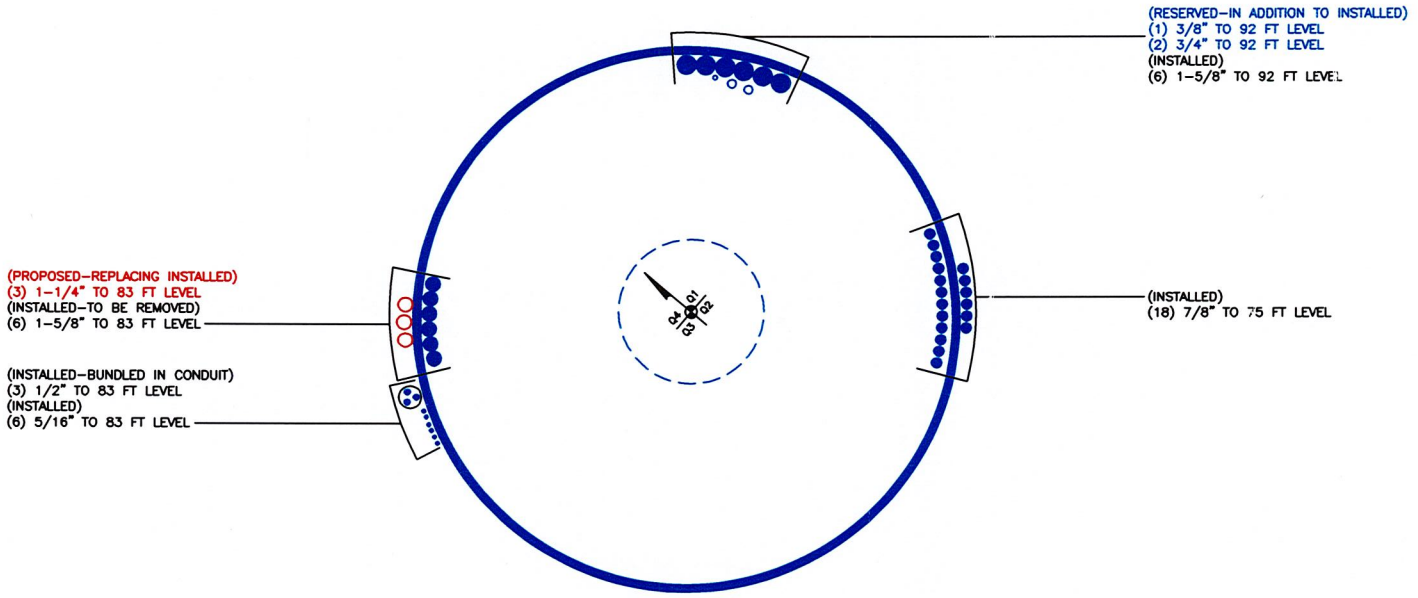
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	96 - 85	Pole	P12x.5	1	-2.31	538.65	16.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L2	85 - 65	Pole	P42x3/8	2	-10.47	1484.55	17.5	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-17.31	1643.28	42.2	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-26.28	2356.76	54.6	Pass
							Summary	
						Pole (L4)	54.6	Pass
						RATING =	**54.6**	**Pass**

Program Version 6.0.4.0 - 1/27/2012 File://FDH-SERVER/Projects/2012 Projects/4 - April/12-04546E/Hayden Station, CT/S3 - SA, RR SNV/Analysis/876326.eri

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876326 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	Rohn

Reactions		
Moment:	213.17	ft-kips
Axial:	10.47	kips
Shear:	11.87	kips
Elevation:	65	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	53		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	6.60	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

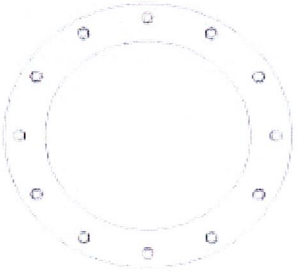
		Rigid
Bolt Tension Capacity, **B**:	103.65 kips	Service, ASD
Max Bolt directly applied T:	9.13 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	3.527 in	
Min PL "treq" for actual **T w/ Pry**:	0.788 in	
Min PL "t1" for actual **T w/o Pry**:	1.047 in	
T allowable with Prying:	58.76 kips	α'>1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	9.13 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	8.8% **Pass**	

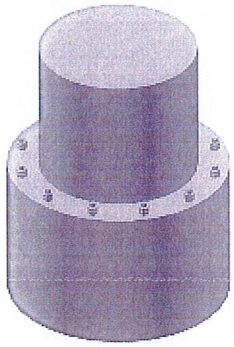
Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		32.33
Tension Side Stress Ratio, (treq/t)^2:	15.5% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	Rohn

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	53		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.54	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	664.22	ft-kips
Axial:	17.31	kips
Shear:	15.77	kips
Elevation:	32.5	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	103.65 kips	Service, ASD
Max Bolt directly applied T:	29.21 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	2.003 in	
Min PL "treq" for actual **T w/ Pry**:	0.794 in	
Min PL "t1" for actual **T w/o Pry**:	1.063 in	
T allowable with Prying:	103.56 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	29.21 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	28.2% Pass	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 22.47

No Prying

Tension Side Stress Ratio, (treq/t)^2: 15.8% Pass

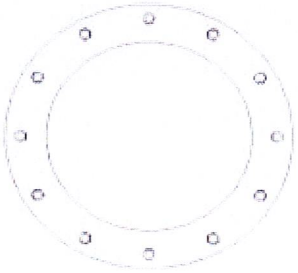
n/a

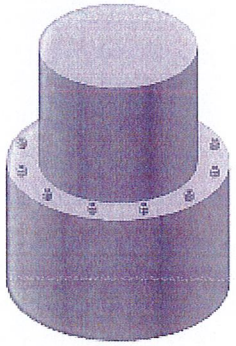
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	1232	ft-kips
Axial:	26	kips
Shear:	19	kips

Anchor Rod Data		
Qty:	20	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	53.5	in

Plate Data		
Diam:	59	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.54	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Both	
Groove Depth:	0.4375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	1	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	54.0 Kips	Rigid
Allowable Tension:	97.2 Kips	Service, ASD
Anchor Rod Stress Ratio:	55.5% **Pass**	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	19.7 ksi	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	54.8% **Pass**	0.75*Fy*ASIF
		Y.L. Length: 23.63

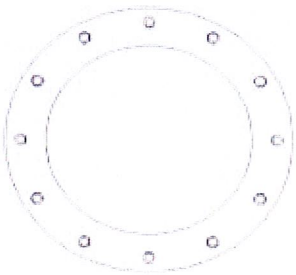
n/a

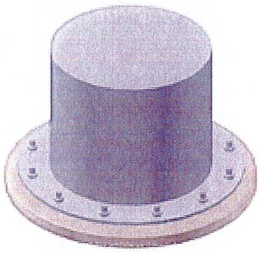
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

CAISSON Version 10.61 2:09:41 PM Friday, October 26, 2012
FDH Engineering

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**********************************************************************************************
*                                                                                            *
* CAISSON - Pier Foundations Analysis and Design -  Copyright Power Line Systems, Inc. 1993-2010 *
*                                                                                            *
**********************************************************************************************
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Project Title: Hayden Station BU 876326
Project Notes:

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
7.00	0.50	3.00	60.00

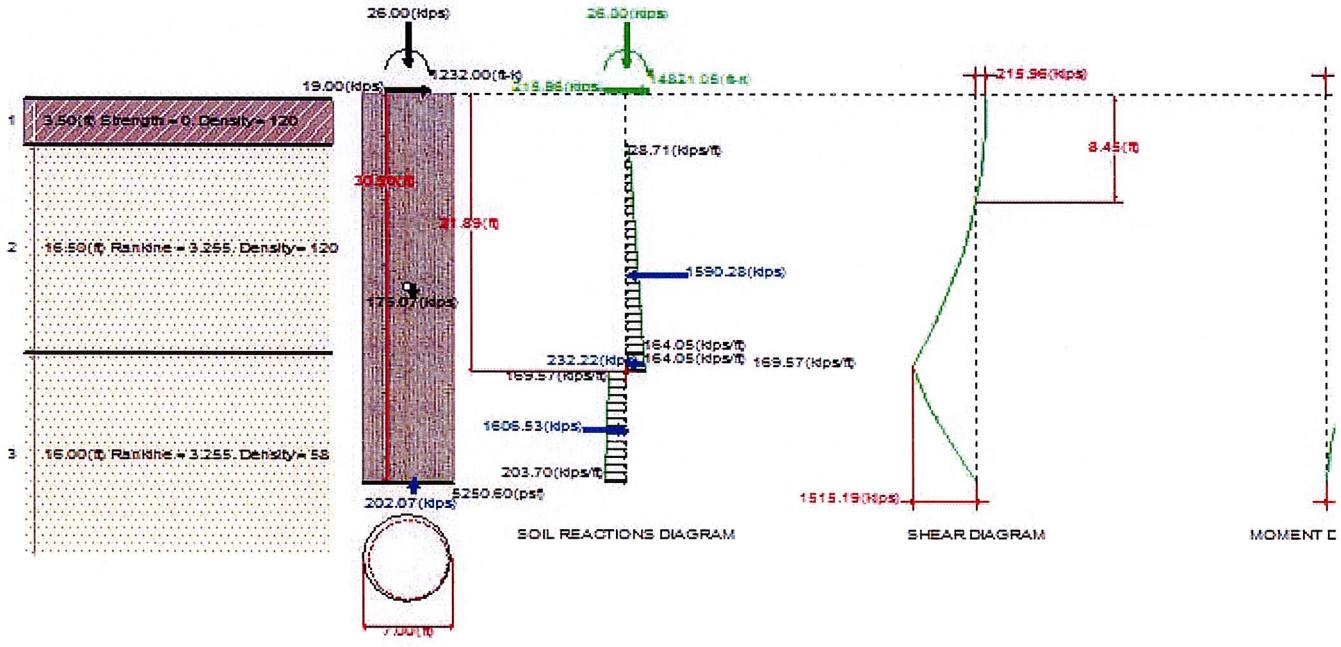
Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	3.50	0.00	120.0			
2	Sand	16.50	3.50	120.0		3.255	32.00
3	Sand	16.00	20.00	58.0		3.255	32.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
1232.0	26.0	19.00	11.35 : Soil Capacity = 2.00/11.35 = 17.6%

******* R E S U L T S



Calculated Pier Properties

Length (ft)	Weight (kips)	Pressure Due To Axial Load (psf)	Pressure Due To Weight (psf)	Total End-Bearing Pressure (psf)
30.500	176.067	675.6	4575.0	5250.6

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.50	3.50	120.0			0.00	2.25
Sand	4.00	16.50	120.0		3.255	1590.28	14.18
Sand	20.50	1.39	58.0		3.255	232.22	21.20
Sand	21.89	8.61	58.0		3.255	-1606.53	26.33

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)	
0.00	216.0	14821.1	19.0	1305.8	
3.05	216.0	15479.7	19.0	1363.9	
6.10	137.6	16062.5	12.1	1415.2	
9.15	-40.7	16229.7	-3.6	1429.9	max
12.20	-295.2	15736.8	-26.0	1386.5	
15.25	-626.1	14351.2	-55.2	1264.4	
18.30	-1033.3	11840.1	-91.0	1043.2	
21.35	-1515.2	7971.2	-133.5	702.3	
24.40	-1168.8	3639.8	-103.0	320.7	
27.45	-602.8	928.7	-53.1	81.8	
30.50	-0.0	-0.0	-0.0	-0.0	

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876326*
Site Name: *Hayden Station*
App #: *####*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.12	ft
Vert. Cage Diameter =	73.48	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	24	
As Total=	30.48	in^2
A s/ Aconc, Rho:	0.0055	0.55%

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	1429.9	ft-kips **(* Note)**
Max. Service Shaft P:	26	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	1858.87	ft-kips
1.30	Pu:	33.8	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2005

Seismic Properties

Seismic Design Category = B
Seismic Risk = **Low**

Solve (Run) <-- Press Upon Completing All Input

ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027	
200 / Fy:	0.0033	
IBC 1810.1.2:	None	SDC A or B
Governing:	0.0033	**0.33%**

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

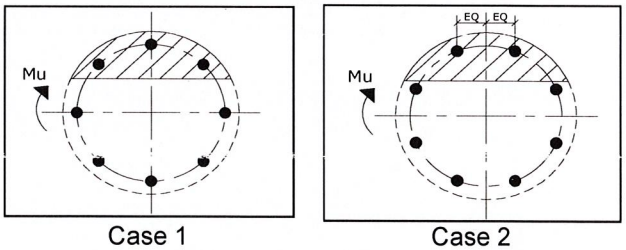
Min As: 0.0050 **0.50%**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.55%	OK

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **13.39** in
Extreme Steel Strain, εt: **0.0146**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

<-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):

Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8258.95	kips
at Mu=(ϕ=0.65)Mn=	5013.77	ft-kips
Max Tu, (φ=0.9) Tn =	1645.92	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	33.80	kips
Drilled Shaft Moment Capacity, φMn:	**4812.04**	ft-kips
Drilled Shaft Superimposed Mu:	**1858.87**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR: 38.63%

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE SHEET
C1	GENERAL NOTES
C2	COMPOUND SITE PLAN & ELEVATION
C3	EQUIPMENT SITE PLANS
C4	EQUIPMENT DETAILS
C5	ANTENNA PLANS
C6	ANTENNA CABLE RISER
C7	EQUIPMENT DETAILS
C8	RF AND CABLE DETAILS
C9	FIBER DISTRIBUTION BOX DETAILS
E1	UTILITY SITE PLAN
E2	DETAILS
E3	GROUNDING PLAN AND DETAILS

DRIVING DIRECTIONS

DEPART FROM SPRINT:
1 INTERNATIONAL BLVD MAHWAH, NJ 07430

1. HEAD NORTH ON INTERNATIONAL BLVD/PARK ST TOWARD QUEENSLAND RD.
2. TAKE THE 3RD RIGHT ONTO PARK LN.
3. CONTINUE STRAIGHT ONTO LEISURE LN.
4. CONTINUE ONTO NJ-17 N.
5. TAKE THE NEW JERSEY 17 N/INTERSTATE 287 N EXIT TOWARD INTERSTATE 87/NORTH Y. THRUWAY.
6. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-287 N/I-87/NJ-17 N/NY. THRUWAY AND MERGE ONTO I-287 N/NJ-17 N.
7. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR I-87 S/I-287/TAPPAN ZEE BR/NEW YORK CITY/NEW YORK THRUWAY AND MERGE ONTO I-287 E/I-87 S.
8. TAKE THE EXIT ONTO I-95 N.
9. TAKE EXIT 4B ON THE LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD.
10. TAKE EXIT 39-41 FOR KENNEDY RD TOWARD CENTER ST.
11. MERGE ONTO ARCHER RD.
12. TURN LEFT ONTO HAYDEN STATION RD.

DESTINATION WILL BE ON THE RIGHT.

OWNER AND TENANT MAY, FROM TIME TO TIME AT TENANT'S OPTION, REPLACE THIS EXHIBIT WITH AN EXHIBIT SETTING FORTH THE LEGAL DESCRIPTION OF THE SITE, OR WITH ENGINEERED OR AS-BUILT DRAWING DEPICTING THE SITE OR ILLUSTRATING STRUCTURAL MODIFICATIONS OR CONSTRUCTION PLANS OF THE SITE. ANY VISUAL OR TEXTUAL REPRESENTATION OF THE EQUIPMENT LOCATED WITHIN THE SITE CONTAINED IN THESE OTHER DOCUMENTS IS ILLUSTRATIVE ONLY, AND DOES NOT LIMIT THE RIGHTS OF SPRINT AS PROVIDED FOR IN THE AGREEMENT. THE LOCATIONS OF ANY ACCESS AND UTILITY EASEMENTS ARE ILLUSTRATIVE ONLY. ACTUAL LOCATIONS MAY BE DETERMINED BY TENANT AND/OR THE SERVICING UTILITY COMPANY IN COMPLIANCE WITH LOCAL LAWS AND REGULATIONS.

Sprint

NETWORK VISION MMBTS LAUNCH
NORTHERN CONNECTICUT MARKET

SITE NAME

HAYDEN STATION

SPRINT SITE NUMBER

CT03XC065

CROWN SITE NUMBER

876329

SITE ADDRESS

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

STRUCTURE TYPE

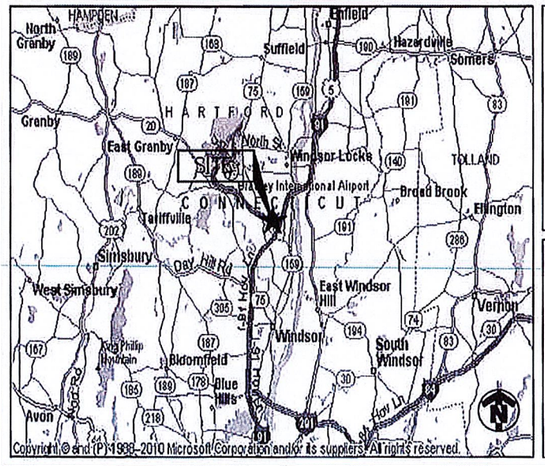
MONOPOLE

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

PROJECT SUMMARY

SITE NAME:	HAYDEN STATION	
SITE NO.:	CT03XC065	
SITE ADDRESS:	440 HAYDEN STATION ROAD WINDSOR, CT 06095	
COUNTY:	HARTFORD	
SITE COORDINATES:		
LATITUDE:	41.89783333' N	(NAD 83)
LONGITUDE:	72.64408333' W	(NAD 83)
GROUND ELEV.:	±157'	(AMSL)
JURISDICTION:	CONNECTICUT SITING COUNCIL	
ZONING CLASSIFICATION:	TBD	
LANDLORD:	CROWN ATLANTIC COMPANY LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317	
CONTACT:	PROJECT MANAGER: DAN VADNEY (518) 433-6262 CONSTRUCTION MANAGER: MIKE CALLAHAN (860) 919-7278	
APPLICANT:	SPRINT 1 INTERNATIONAL BLVD. MAHWAH, NJ 07495	
PROJECT MANAGER:	ALCATEL LUCENT 1 ROBBINS ROAD WESTFORD, MA 01886	
CONTACT:	CAMILLE MULLIGAN - (845) 313-6920	
CONSTRUCTION MANAGER:	TRACEY SWEARINGEN (518) 944-8794 (CELL)	
ENGINEER:	INFINIGY 11 HERBERT DRIVE LATHAM, NY 12110	
CONTACT:	PAUL FANOS - (518) 690-0790	
BUILDING CODE:	2003 INTERNATIONAL BUILDING CODE 2005 CONNECTICUT BUILDING CODE W/ 2009 AMENDMENT UNIFORM MECHANICAL CODE UNIFORM PLUMBING CODE LOCAL BUILDING CODE CITY/COUNTY ORDINANCES	
ELECTRICAL CODE:	2005 NATIONAL ELECTRICAL CODE	

VICINITY MAP



PROJECT TEAM

ALCATEL·LUCENT

1 ROBBINS ROAD
WESTFORD, MA 01886

PROJECT MANAGER

INFINIGY Design. Build. Deliver.

11 Herbert Drive
Latham, NY 12110
OFFICE #: (518) 690-0790
FAX #: (518) 690-0793

ENGINEER

SCOPE OF WORK:

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
- FACILITY HAS NO PLUMBING OR REFRIGERANTS
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. CABINETS, ANTENNAS/RRU AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
- INSTALL NEW ANTENNAS/RRH'S ON EXISTING TOWER
- INSTALL NEW BTS OR RETROFIT EXISTING BTS IN EXISTING EQUIPMENT AREA
- REMOVE EXISTING CDMA ANTENNAS AND COAX CABLES
- REPLACE EXISTING BATTERY CABINET WITH NEW BATTERY CABINET IF REQUIRED
- REPLACE EXISTING GPS IF REQUIRED

ENGINEER'S LICENSE

CERTIFICATION STATEMENT:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT.

LICENSED ENGINEER - STATE OF CONNECTICUT

APPROVALS

SPRINT CONST.		DATE
ALU RF		DATE
ALU LEASING/SITE ACQ.		DATE
IN-MARKET CONSTRUCTION LEAD		DATE
SITE OWNER	NAME/COMPANY: TITLE:	DATE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

No.	Submittal / Revision	Appv'd	Date
1	REVISED PER COMMENTS	SKB	12/17/12
0	ISSUED FOR REVIEW	KMF	11/7/12

Drawn: KMF Date: 11/7/12
Designed: AJD Date: 11/7/12
Checked: AGF Date: 11/7/12

Project Number 294-044

Project Title

HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For

Sprint VISION

Drawing Scale: AS NOTED
Date: 12/17/12

Drawing Title

TITLE SHEET

Drawing Number

T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: SPRINT NEXTEL CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT NEXTEL WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY SPRINT NEXTEL TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR SPRINT NEXTEL PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT NEXTEL OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY CROWN CASTLE CONSTRUCTION OR PROJECT MANAGER IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.

C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.

D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.

F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS. HYBERFLEX TESTING NOT LIMITED TO COAX SWEEPS.

G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH, EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ICE, SNOW, ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ICE, SNOW ROOTS, SOD, RUBBISH, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

PROJECT INFORMATION

THIS IS AN UNMANNED AND RESTRICTED ACCESS EQUIPMENT FACILITY AND WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC WIRELESS COMMUNICATIONS SERVICE.

NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.

NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.

NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.

SPRINT MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

LEGEND

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
KWH	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
#	DENOTES REFERENCE NOTE
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	PIN AND SLEEVE RECEPTACLE
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

INFINIGY
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STATE OF CONNECTICUT
JOHN S. STEVENS
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LICENSED PROFESSIONAL ENGINEER

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Project Number
204-044

Project Title

HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For

Sprint VISION

Drawing Scale: AS NOTED
Date: 12/17/12

Drawing Title

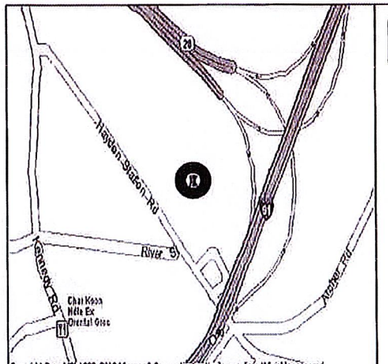
GENERAL NOTES

Drawing Number

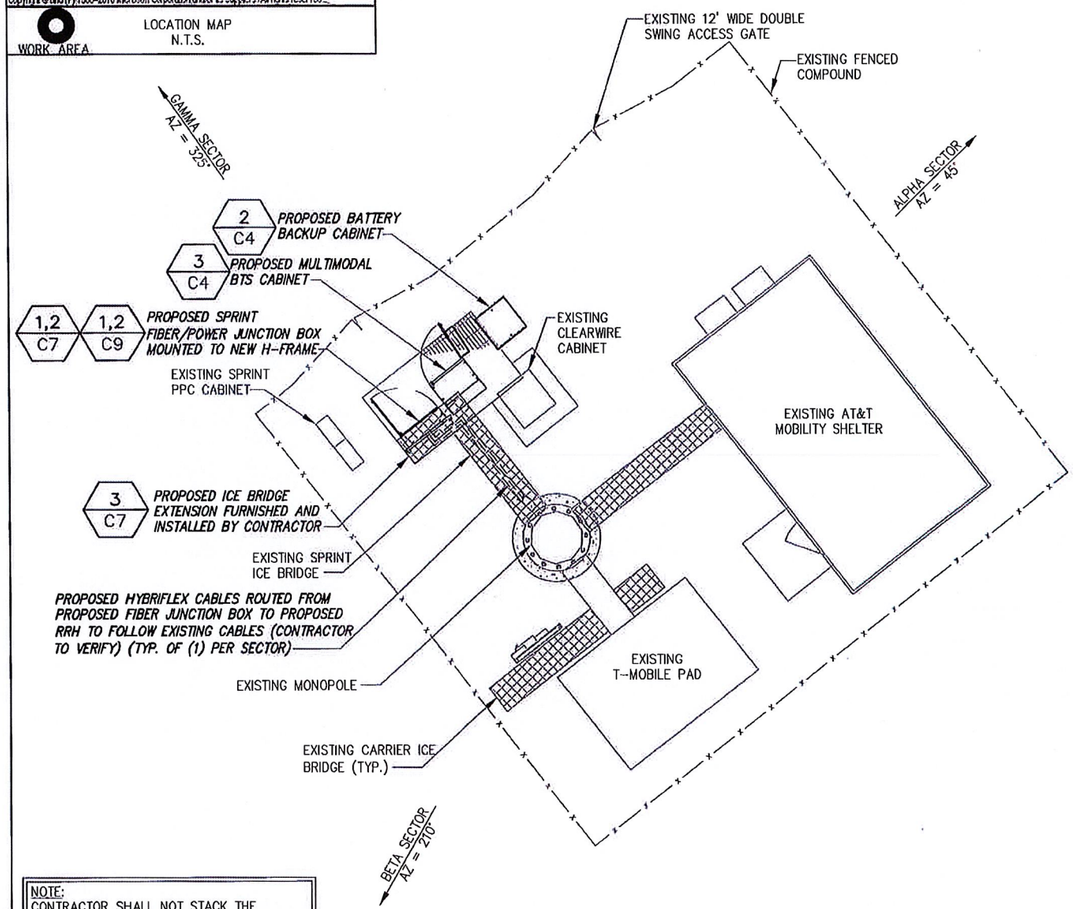
C1

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION.

FOR ADDITIONAL STRUCTURAL INFORMATION, REFER TO STRUCTURAL REPORT PREPARED BY FDH ENGINEERING, DATED 10/26/12



LOCATION MAP
N.T.S.



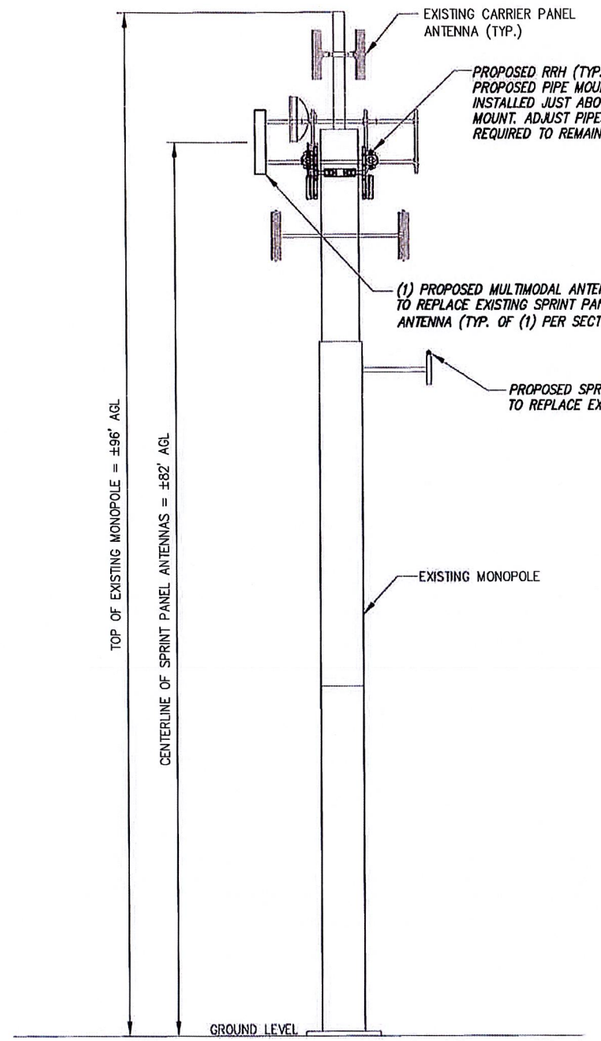
NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT: "EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 – 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A – WTHRPRF – STD CONSTR SPECS._15720111042185542 9.DOCM"
3. REFER TO: "COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

CALLED NORTH

1 — COMPOUND SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE
10' 5' 0 5' 10'
SCALE (11x17): 1" = 10'–0"
SCALE (22x34): 1" = 5'–0"



2 — SITE ELEVATION
NOT TO SCALE

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CT03XC065

440 HAYDEN STATION ROAD
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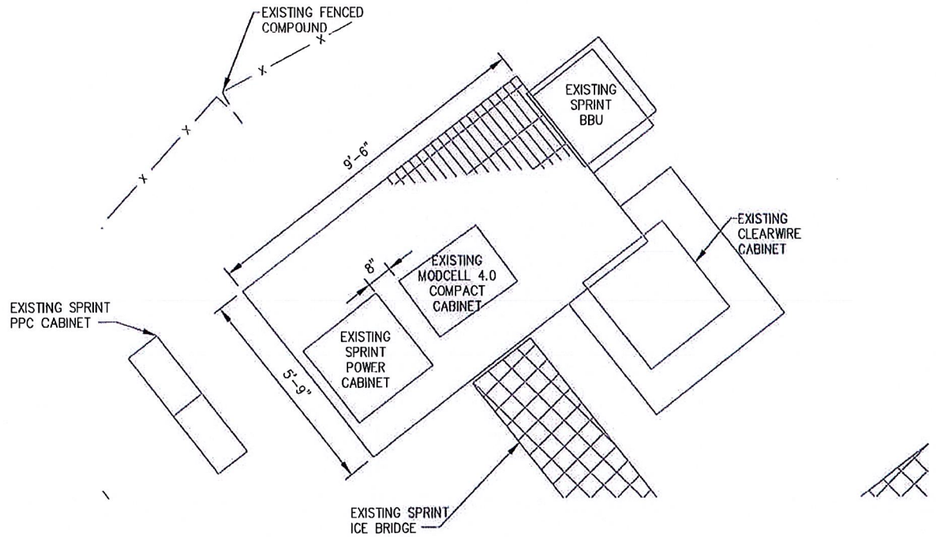
Date: 12/17/12

Drawing Title
COMPOUND SITE PLAN & ELEVATION

Drawing Number
C2



CALLED NORTH

1 / -- EQUIPMENT SITE PLAN (EXISTING)
SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
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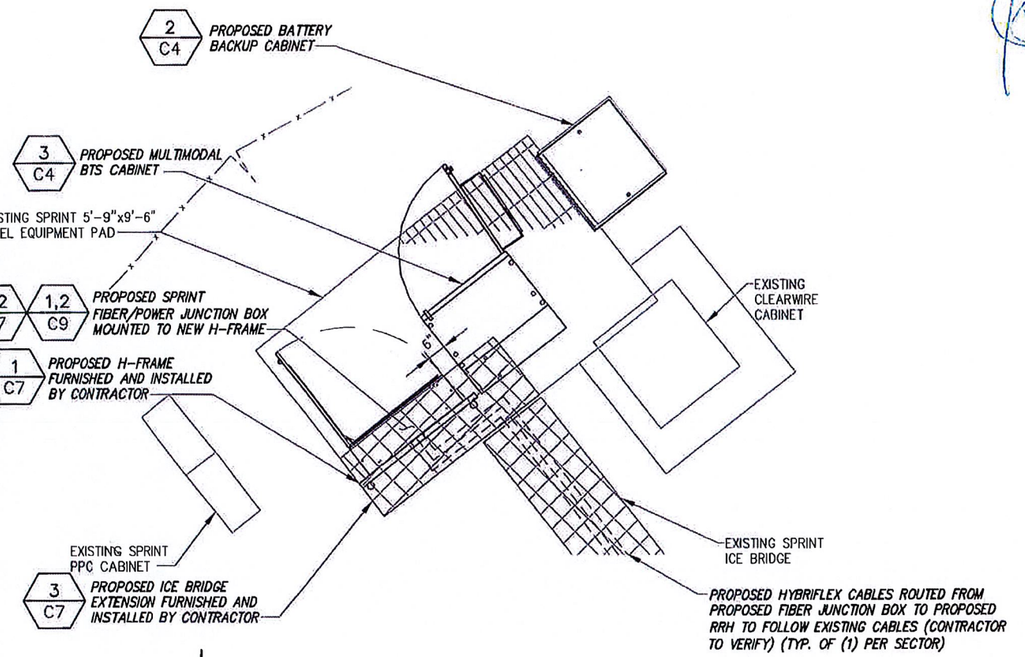
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.



CALLED NORTH

2 / -- EQUIPMENT SITE PLAN (FINAL/PERMANENT)
SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

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CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

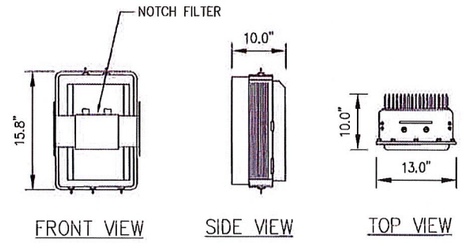
Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
12/17/12

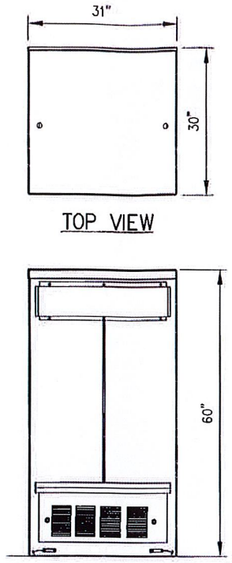
Drawing Title
EQUIPMENT SITE PLANS

Drawing Number
C3

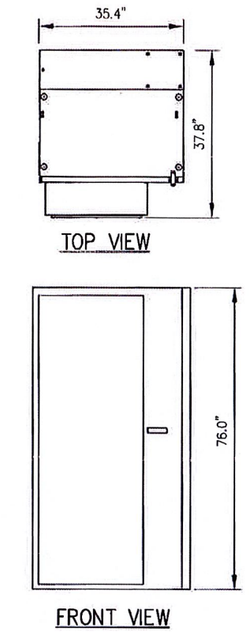


NOTE:
REFER TO R.F. SYSTEM SCHEDULE FOR EXACT RRH SPECIFICATIONS AND QUANTITIES.

1 RRH EQUIPMENT DETAILS
NOT TO SCALE



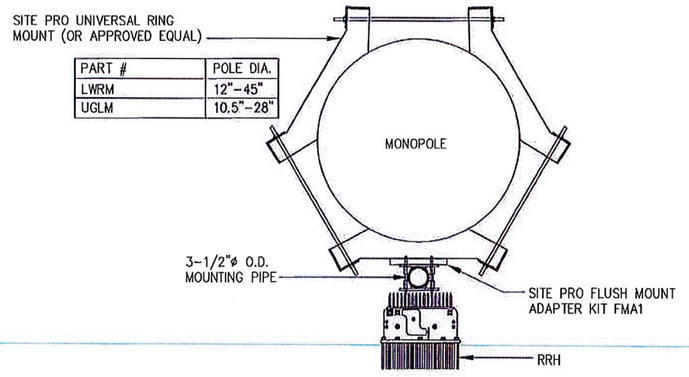
2 BATTERY CABINET PROFILE
NOT TO SCALE

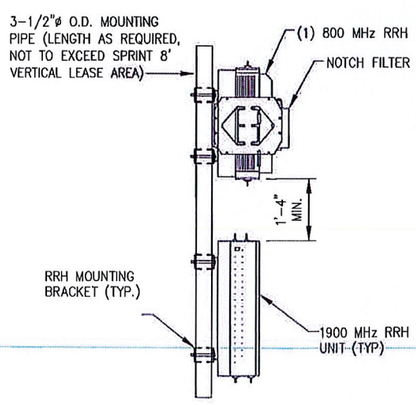


3 BTS CABINET PROFILE
NOT TO SCALE

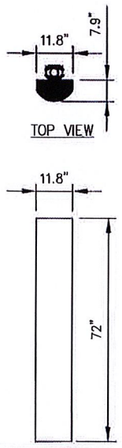
DESIGN CRITERIA:

2009 INTERNATIONAL BUILDING CODE W/ STATE MODIFICATION	
WIND SPEED (ASCE-7-05)	90 MPH
EXPOSURE B	
IMPORTANCE FACTOR	1.0
SEISMIC SITE CLASS	D
Ss=0.152 S1=0.050	
SEISMIC IMPORTANCE FACTOR	1.0
SEISMIC DESIGN CATEGORY	B
CABINET WEIGHT:	
9928 MM BTS CABINET	1074 LBS.
60EC V2 BATTERY CABINET	2830 LBS.
MATERIAL SPECIFICATIONS	
C-, M-, AND ANGLE SHAPES:	ASTM A36
HIGH-STRENGTH BOLTS:	ASTM A325SC OR (A325N)
STRUCTURAL WF SHAPES:	ASTM A572-GR50
TUBE STEEL & PIPE COLUMNS:	ASTM A500, GRADE B
WELDING ELECTRODES:	E70XX
W - SHAPES:	ASTM A992, GRADE 50
U-BOLTS:	ASTM A36



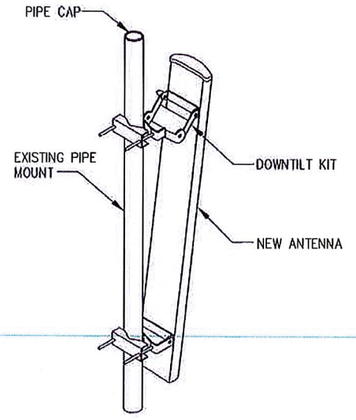


4 RRH MOUNTING DETAIL (TYP.)
NOT TO SCALE



RFS ANTENNA
P/N: APXV9ERR18-C-A20

5 ANTENNA DETAILS
NOT TO SCALE



6 PANEL ANTENNA MOUNT DETAIL
NOT TO SCALE

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Fax # (518) 690-0793

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Project Number
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Project Title

HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
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Prepared For
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Drawing Scale:
AS NOTED

Date:
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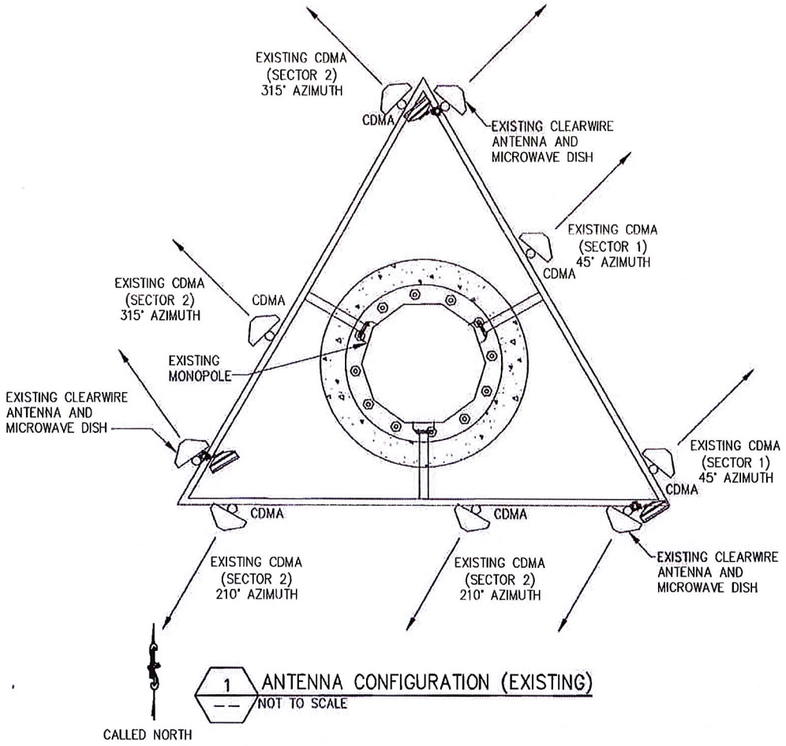
Drawing Title

EQUIPMENT DETAILS

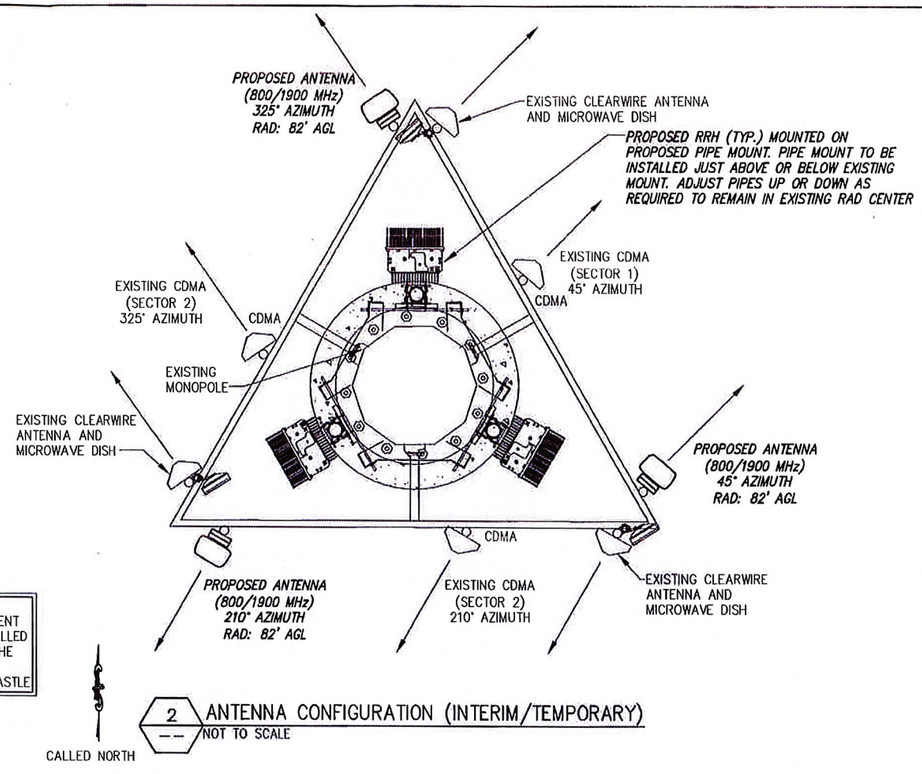
Drawing Number

C4

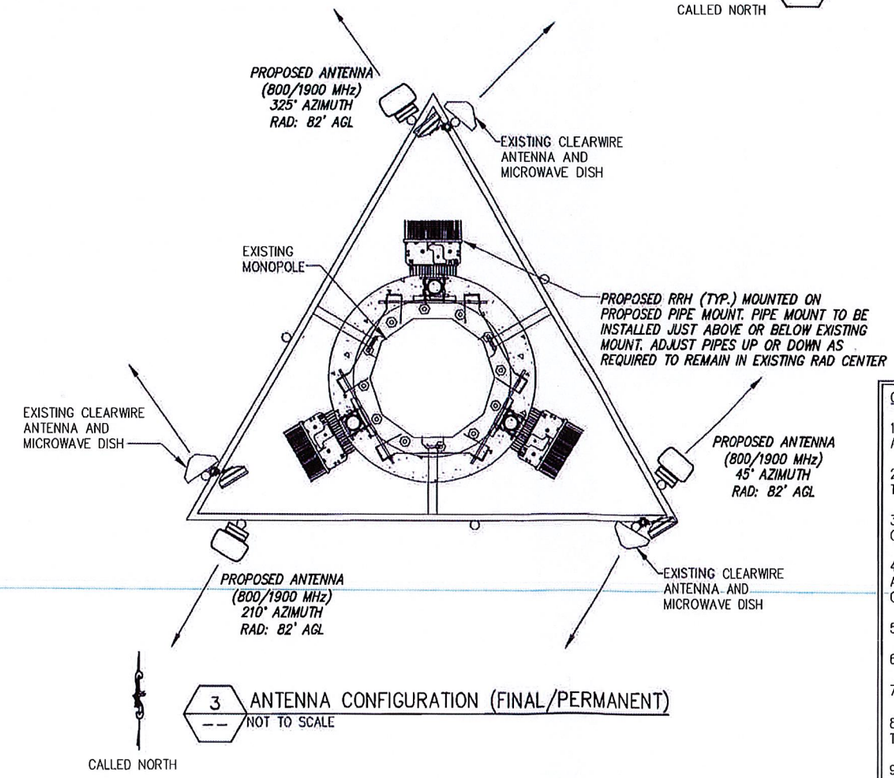


1 ANTENNA CONFIGURATION (EXISTING)
NOT TO SCALE

NOTE:
ALL ANTENNAS, EQUIPMENT AND COAX TO BE INSTALLED IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE



2 ANTENNA CONFIGURATION (INTERIM/TEMPORARY)
NOT TO SCALE



3 ANTENNA CONFIGURATION (FINAL/PERMANENT)
NOT TO SCALE

NOTE:
REQUIRED PIPE MOUNTS TO BE SUPPLIED BY CONTRACTOR.

FOR ADDITIONAL STRUCTURAL INFORMATION, REFER TO STRUCTURAL REPORT PREPARED BY FDH ENGINEERING, DATED 10/26/12

RRH NOTES:

- SEE PAGE C4 FOR RRH MOUNTING INFORMATION (TYP. ALL SECTORS).
- REFER TO RF SCHEDULE ON SHEET C8 FOR RRH UNIT SPECS AND QUANTITIES.

GENERAL NOTES:

1. NEW SPRINT PANEL ANTENNAS TO MEET RF DESIGN REQUIREMENTS PER EBTS, PER APPROVED STRUCTURAL ANALYSIS.
2. CONTRACTOR TO PROVIDE EXISTING ANTENNA VERIFICATION AND TO INCLUDE MOUNTING HEIGHT, RAD CENTER, TOP AND BOTTOM OF ANTENNAS.
3. THE CONFIGURATION PLANS ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS.
4. THE ANTENNA INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS AND ASSOCIATED DETAILS THEREIN. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO WORK ON THE STRUCTURE.
5. CONTRACTOR SHALL VERIFY NEW PARTS BEFORE ORDERING.
6. REFER TO SHEET C4 & C8 FOR ANTENNA SPECS.
7. CONTRACTOR TO USE PROPER TORQUE WHEN INSTALLING AND TIGHTENING CONNECTORS TO INSURE PROPER FIT.
8. ALL HYBRID CABLES SHALL BE MARKED WITHIN 24" OF THE END OF EACH CABLE WITH 2" WIDE VINYL TAPE. THIS INCLUDES ALL JUMPERS AND MAIN LINE HYBRID CABLES.
9. CDMA ANTENNAS SHALL NOT BE REMOVED UNTIL ALL NEW MULTI-MODE ANTENNAS ARE INSTALLED AND ON-AIR.

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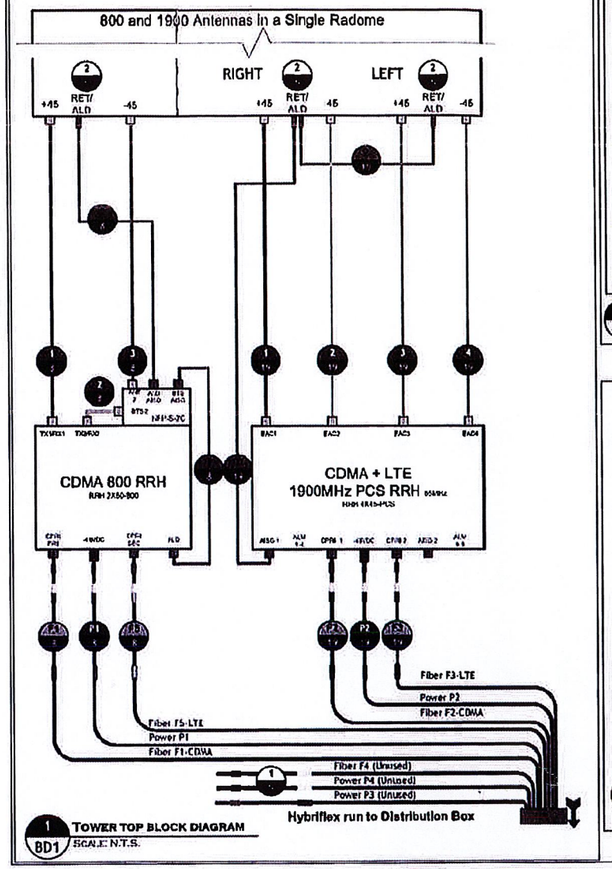
Drawing Title
ANTENNA PLANS

Drawing Number
C5



1 BD1 TOWER TOP BLOCK DIAGRAM
SCALE: N.T.S.

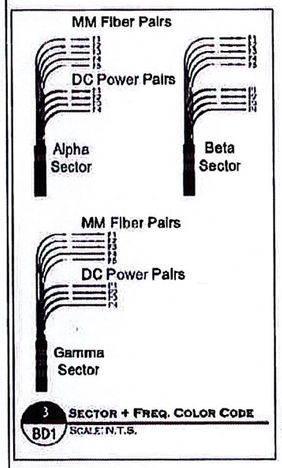
Power Feed Polarity Definition:
IF wires are BLACK AND BLACK/ WHITE STRIPE:
- Black= -48VDC Feed (Battery)
- Black/White Stripe= Return

IF wires are RED AND BLACK:
- Red= -48VDC Feed (Battery)
- Black= Return

NOTE: For power feed use the same Hybriflex OEM color designator as the fiber.

- MM Pair 1= F1= Green= P1(Green)
- MM Pair 2= F2= Blue= P2(Blue)
- MM Pair 3= F3= Red= P3(Red)
- MM Pair 4= F4= Yellow= P4(Yellow)
- MM Pair 5= F5= Orange= (No P5 power feed)

2 BD1 HYBRIFLEX OEM COLOR CODE
SCALE: N.T.S.



3 BD1 SECTOR + FREQ. COLOR CODE
SCALE: N.T.S.

4 BD1 DIAGRAM LEGEND
SCALE: N.T.S.

SCENARIO 124 v1.7

1 -- ANTENNA CABLE RISER DIAGRAM
NOT TO SCALE

INSTALLER VERIFY LATEST PLUMBING/WIRING DIAGRAMS, PRIOR TO INSTALLATION.

WEATHERPROOFING CONNECTORS AND GROUND KIT NOTES:
1. ALL CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED USING BUTYL RUBBER WEATHERPROOFING AND TAPE, THIS INSTALLATION MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION OR PER THE FOLLOWING INSTRUCTIONS (WHICHEVER IS GREATER).
2. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE ENCOMPASSED INTO COLD SHRINK AND COMPLETELY WRAPPED WITH 2 IN. WIDE ELECTRICAL TAPE OVERLAPPING EACH ROW BY APPROXIMATELY ½" AND EXTENDING PAST THE CONNECTION BY TWO INCHES AND DISCUSSED BELOW; OR
3. THE COAXIAL ABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH LAYERS OR ELECTRICAL/BUTYL RUBBER/ELECTRICAL TAPE AS DISCUSSED BELOW OR;
4. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH TWO LAYERS OF 1.5 INCH WIDE SELF-AMALGAMATING TAPE COVERED WITH TWO LAYERS OF ELECTRICAL TAPE.

RRH JUMPER NOTES:
1. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS LESS THAN 10'-0" USE A 1/2" JUMPER.
2. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS GREATER THAN 10'-0" USE A 7/8" JUMPER.

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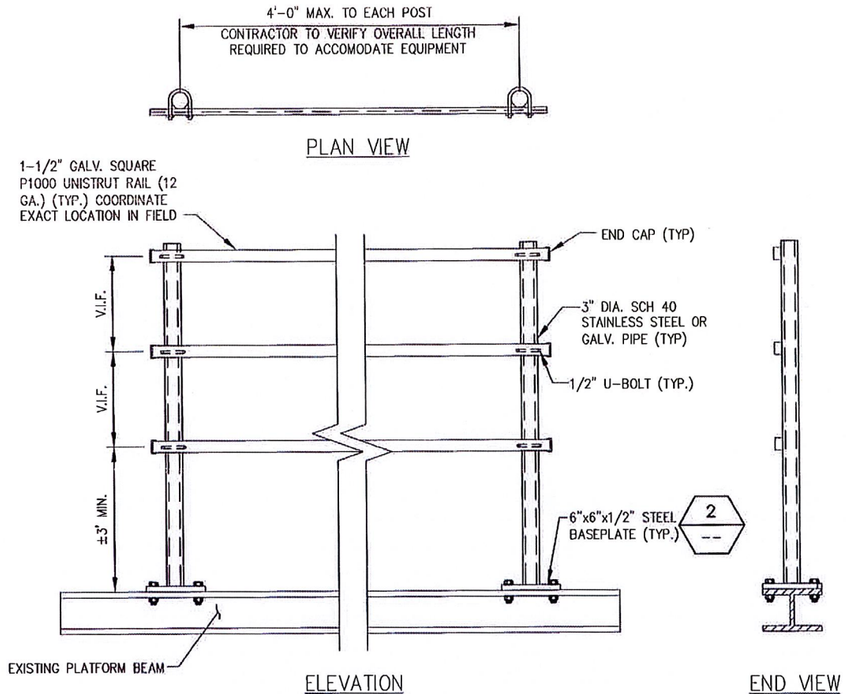
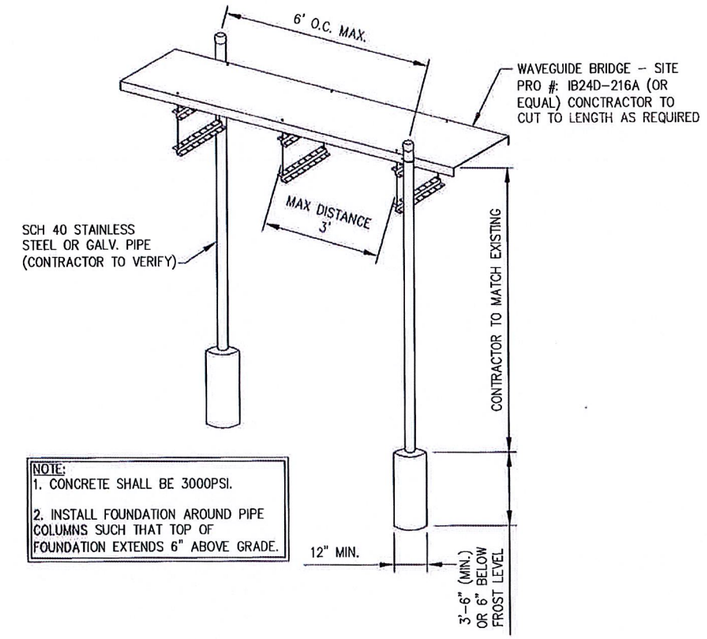
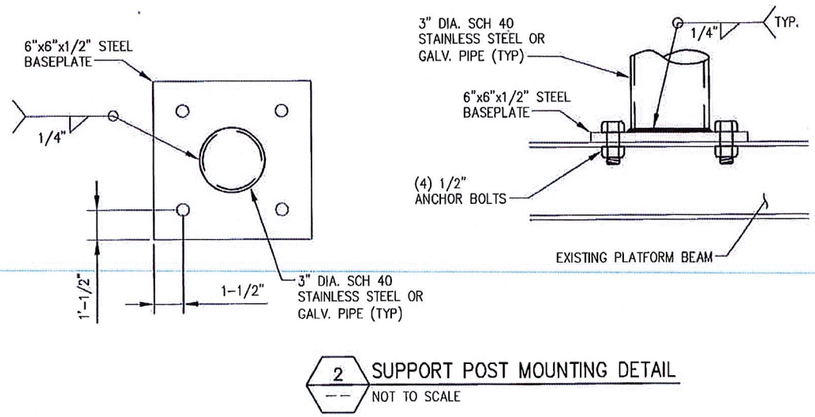
Drawing Title
ANTENNA CABLE RISER DETAILS

Drawing Number
C6







INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appvd	Date
1	REVISED PER COMMENTS	SKB	12/17/12
0	ISSUED FOR REVIEW	KMF	11/7/12

Drawn: KMF Date: 11/7/12
Designed: AJD Date: 11/7/12
Checked: AGF Date: 11/7/12

Project Number
204-044

Project Title

HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For

Sprint VISION

Drawing Scale: AS NOTED
Date: 12/17/12

Drawing Title

EQUIPMENT DETAILS

Drawing Number

C7

	Market	Northern Connecticut		
	Cascade ID	CT03XC065		
		SECTOR 1	SECTOR 2	SECTOR 3
1900	Split sector present	No	No	No
	1900MHz_Azimuth	45	210	325
	1900MHz_No_of_Antennas	1	1	1
	1900MHz_RADCenter(ft)	82	82	82
	1900MHz_Antenna Make	RFS	RFS	RFS
	1900MHz_Antenna Model	APXVSPP18-C-A20	APXVSPP18-C-A20	APXVSPP18-C-A20
	1900MHz_Horizontal_Beamwidth	65	65	65
	1900MHz_Vertical_Beamwidth	5.5	5.5	5.5
	1900MHz_AntennaHeight (ft)	6	6	6
	1900MHz_AntennaGain(dBd)	15.9	15.9	15.9
	1900MHz_E_Tilt	0	0	-4
	1900MHz _M_Tilt	-2	0	0
	1900MHz_Carrier_Forecast_Year_2013	3	3	3
	1900MHz_RRH Manufacturer	ALU	ALU	ALU
	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
	1900MHz_RRH Count	1	1	1
	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	1900MHz Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required
	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax	LCF12-50J	LCF12-50J	LCF12-50J
	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A
	1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
	1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800	800MHz_Azimuth	45	210	325
	800MHz_No_of_Antennas	0	0	0
	800MHz_RADCenter(ft)	82	82	82
	800MHz_AntennaMake	RFS	RFS	RFS
	800MHz_AntennaModel	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
	800MHz_Horizontal_Beamwidth	65	65	65
	800MHz_Vertical_Beamwidth	11.5	11.5	11.5
	800MHz_AntennaHeight (ft)	6	6	6
	800MHz_AntennaGain (dBd)	13.4	13.4	13.4
	800MHz_E_Tilt	0	-8	-8
	800MHz_M_Tilt	-2	0	0
	800MHz_RRH Manufacturer	ALU	ALU	ALU
	800MHz_RRH Model	800 MHz RRH 2x50W	800 MHz RRH 2x50W	800 MHz RRH 2x50W
	800MHz_RRH Count	1	1	1
	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
	Plumbing Scenario *	124	124	124
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager			
	11/9/2012			

NOTE:
RFDS SHOWN PROVIDED BY SPRINT DATED 11/9/12.

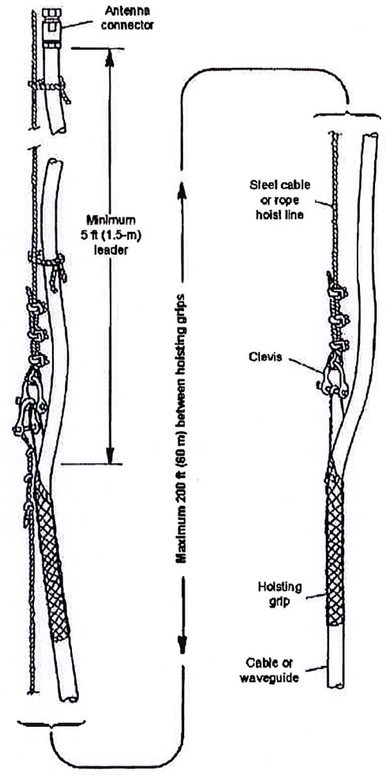
NOTE:
COORDINATE RF ANTENNA INSTALLATION WITH FINAL SPRINT RFDS. COORDINATE RF MW DISH (IF APPLICABLE) INSTALLATION WITH FINAL SPRINT RFDS.

1 SPRINT RFDS
NOT TO SCALE

CHECK FST FOR LATEST VERSION OF RFDS

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT: "EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 – 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A – WTHRPRF – STD CONSTR SPECS._15720111042185542 9.DOCM"
3. REFER TO: "COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

1. DO NOT USE ONE HOISTING GRIP FOR HOISTING TWO OR MORE CABLES OR CABLE TRAYS. THIS CAN CAUSE THE HOISTING GRIP TO BREAK OR THE CABLES OR WAVE– GUIDES TO FALL.
2. DO NOT USE THE HOISTING GRIP FOR LOWERING CABLE OR CABLE TRAY. SNAGGING OF THE CABLE OR CABLE TRAY MAY LOOSEN THE GRIP AND POSSIBLY CAUSE THE CABLE TO CABLE TRAY TO SWAY OR FALL.
3. DO NOT REUSE HOISTING GRIPS. USED GRIPS MAY HAVE LOST ELASTICITY, STRETCHED, OR BECOME WEAKENED. REUSING A GRIP CAN CAUSE THE CABLE OR CABLE TRAY TO SLIP, BREAK, OR FALL.
4. USE HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200 FT (60 M).
5. MAKE SURE THAT THE PROPER HOISTING GRIP IS USED FOR THE CABLE OR CABLE TRAY BEING INSTALLED. SLIPPAGE OR INSUFFICIENT GRIPPING STRENGTH WILL RESULT IF YOU ARE USING THE WRONG HOISTING GRIP.



2 HOIST GRIP DETAIL
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
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Fax # (518) 690-0793

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CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

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Sprint VISION

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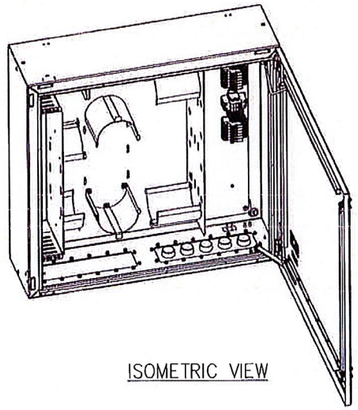
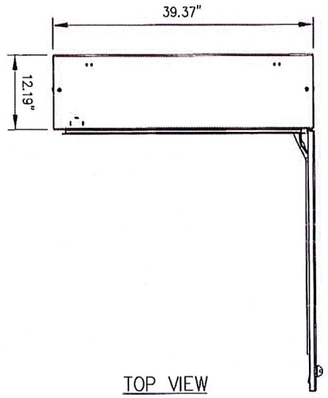
12/17/12

Drawing Title
RF AND CABLE DETAILS

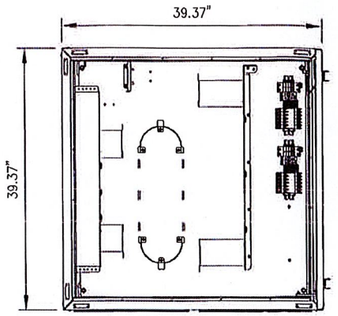
Drawing Number
C8



ISOMETRIC VIEW



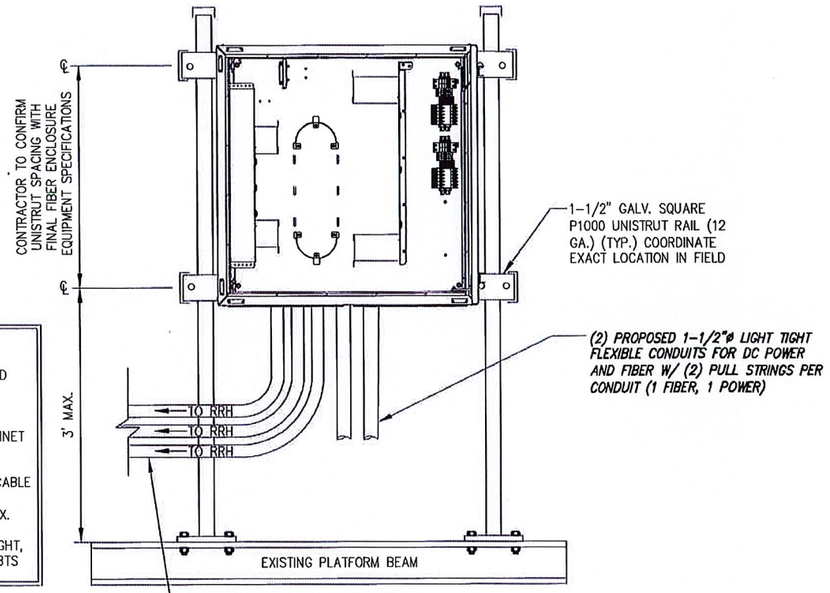
TOP VIEW



FRONT VIEW

SIDE VIEW

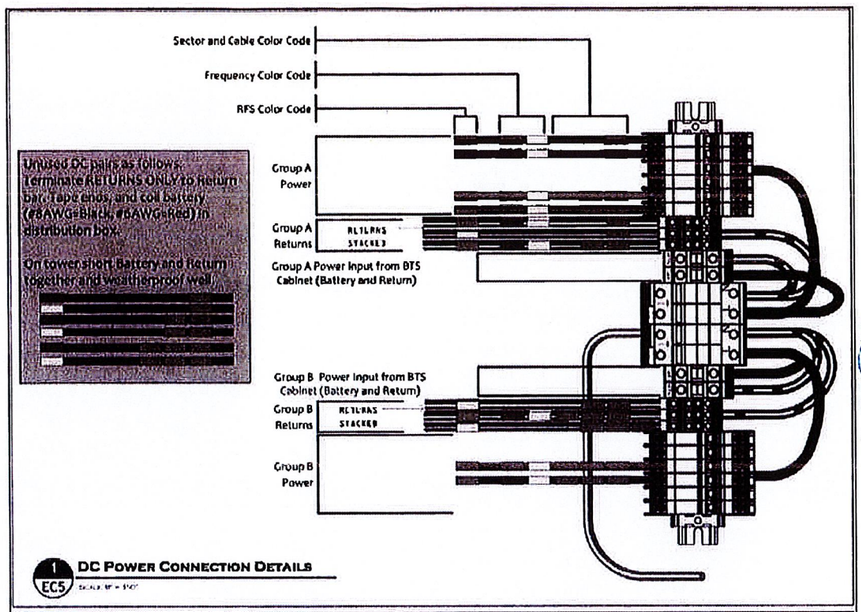
1 DISTRIBUTION BOX DETAIL
NOT TO SCALE



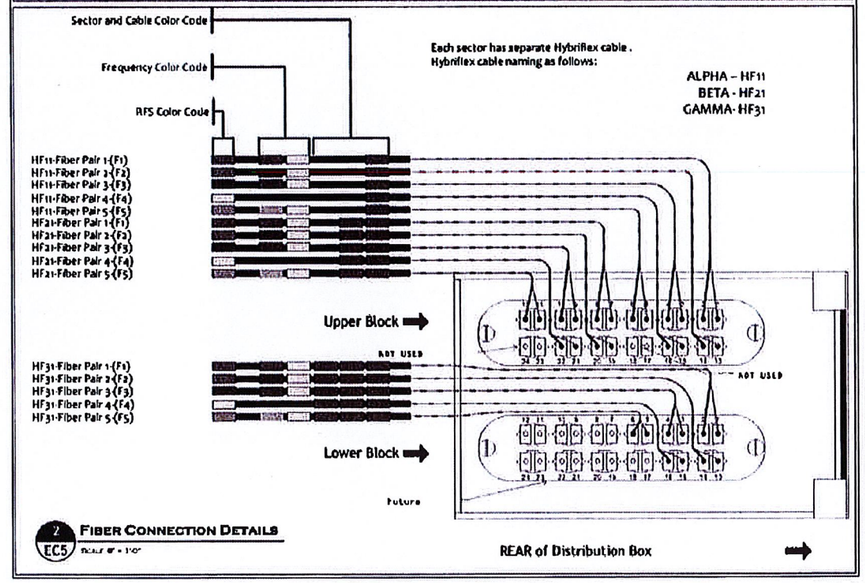
NOTE:
- DISTRIBUTION BOX IS KITTED WITH 50' OF 1-1/2" LIQUID-TIGHT CONDUIT AND CONNECTORS. THIS SHOULD BE:
  * SPLIT IN HALF,
  * TERMINATED TO THE DISTRIBUTION BOX AS SHOWN,
  * RAN TO AND COILED AS CLOSE TO WHERE THE CABINET IS GOING TO BE MOUNTED AS POSSIBLE.
- DISTRIBUTION BOX IS KITTED WITH 2 AWG, POWER CABLE 35' x 2EA. RUNS RED AND 2EA. RUNS BLACK. THIS SHOULD BE COILED AND LEFT INSIDE DISTRIBUTION BOX.
- BTS INSTALLATION TEAM WILL TERMINATE LIQUID-TIGHT, RUN THE FIBER JUMPERS AND POWER CABLES FROM BTS CABINET TO DISTRIBUTION BOX.

NOTE:
1. ANCHORS AND UNISTRUT CHANNEL SHALL HAVE HOT-DIPPED GALVANIZED FINISH.
2. MOUNT FIBER AND POWER DISTRIBUTION BOX WITH FOUR (4) 1/4"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS.

2 TYPICAL DISTRIBUTION BOX ON H-FRAME DETAIL
NOT TO SCALE



1 EC5 DC POWER CONNECTION DETAILS



2 EC5 FIBER CONNECTION DETAILS

SCENARIO 124 v1.7

3 FIBER & DC CONNECTION DETAILS
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
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Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

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Project Number
294-044

Project Title
HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
12/17/12

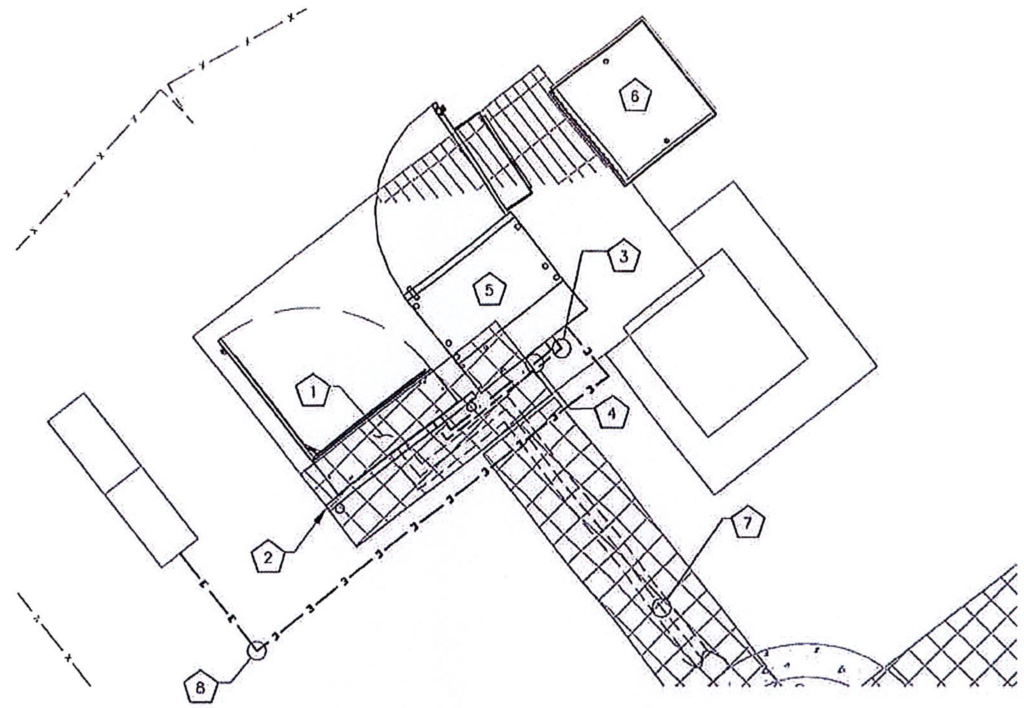
Drawing Title
FIBER DISTRIBUTION BOX DETAILS

Drawing Number
C9

CODED NOTES:

1. *PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO NEW H-FRAME*
2. *PROPOSED H-FRAME FURNISHED AND INSTALLED BY CONTRACTOR*
3. *PROPOSED 1-1/2" LIQUID TIGHT CONDUIT WITH PULL-STRING FOR TELCO FROM FIBER JUNCTION BOX TO RADIO EQUIPMENT CABINET, 5'*
4. *PROPOSED 1-1/2" LIQUID TIGHT CONDUIT WITH PULL-STRING FOR DC POWER FROM FIBER JUNCTION BOX TO RADIO EQUIPMENT CABINET, 5'*
5. *PROPOSED MULTIMODAL BTS CABINET*
6. *PROPOSED BATTERY BACKUP CABINET*
7. *PROPOSED HYBRIFLEX CABLES ROUTED FROM PROPOSED FIBER JUNCTION BOX TO PROPOSED RRH TO FOLLOW EXISTING CABLES (CONTRACTOR TO VERIFY) (TYP. OF (1) PER SECTOR)*
8. *PROPOSED 2"ø LIQUID TIGHT CONDUIT ROUTED FROM BTS TO EXISTING PPC CABINET*

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.



CALLED NORTH

1 UTILITY SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE
4' 2' 0 2' 4'
SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

ELECTRICAL NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (N.E.C.), AND APPLICABLE LOCAL CODES
2. GROUNDING SHALL COMPLY WITH THE ARTICLE 250 OF NATIONAL ELECTRICAL CODE.
3. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED.
4. ALL WIRES SHALL BE AWG MIN #12 THHN COPPER UNLESS NOTED.
5. CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT UNLESS NOTED OTHERWISE.
6. LABEL SPRINT SERVICE DISCONNECTS WITH SWITCH AND PPC CABINET WITH ENGRAVED LAMACOID LABELS, LETTERS 1" IN HEIGHT.
7. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 8" RADIUS.
8. ENGAGE AN INDEPENDENT TESTING FIRM TO TEST AND VERIFY THAT RESISTANCE DOES NOT EXCEED 10 OHMS TO GROUND. TEST GROUND RING RESISTANCE PRIOR TO MAKING FINAL GROUND CONNECTIONS TO INFRASTRUCTURE AND EQUIPMENT. GROUNDING AND OTHER OPERATIONAL TESTING SHALL BE WITNESSED BY SPRINT REPRESENTATIVE.
9. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE REQUIRED SO THAT CONDUIT BENDS DO NOT EXCEED 360 DEGREES.
10. OBTAIN PERMITS AND PAY FEES RELATED TO ELECTRICAL WORK PERFORMED ON THIS PROJECT. DELIVER COPIES OF ALL PERMITS TO SPRINT REPRESENTATIVE.
11. SCHEDULE AND ATTEND INSPECTIONS RELATED TO ELECTRICAL WORK REQUIRED BY JURISDICTION HAVING AUTHORITY. CORRECT AND PAY FOR ANY WORK REQUIRED TO PASS ANY FAILED INSPECTION.
12. REDLINED AS-BUILTS ARE TO BE DELIVERED TO A SPRINT REPRESENTATIVE.
13. PROVIDE TWO COPIES OF OPERATION AND MAINTENANCE MANUALS IN THREE-RING BINDER.
14. FURNISH AND INSTALL THE COMPLETE ELECTRICAL SERVICE, TELCO CONDUIT, AND THE COMPLETE GROUNDING SYSTEM.
15. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND LOCAL ORDINANCES, INSTALLED IN A NEAT MANNER AND SHALL BE SUBJECT TO APPROVAL BY A SPRINT REPRESENTATIVE.
16. CONDUCT A PRE-CONSTRUCTION SITE VISIT AND VERIFY EXISTING SITE CONDITIONS AFFECTING THIS WORK. REPORT ANY OMISSIONS OR DISCREPANCIES FOR CLARIFICATION PRIOR TO THE START OF CONSTRUCTION.
17. PROJECT ADJACENT STRUCTURES AND FINISHES FROM DAMAGE, REPAIR TO ORIGINAL CONDITION ANY DAMAGED AREA.
18. REMOVE DEBRIS ON A DAILY BASIS. DEBRIS NOT REMOVED IN A TIMELY FASHION WILL BE REMOVED BY OTHERS AND THE RESPONSIBLE SUBCONTRACTOR SHALL BE CHARGED ACCORDINGLY. REMOVAL OF DEBRIS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE. DEBRIS SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF LEGALLY.
19. UPON COMPLETION OF WORK, THE SITE SHALL BE CLEAN AND FREE OF DUST AND FINGERPRINTS.
20. PRIOR TO ANY TRENCHING, CONTACT LOCAL UTILITY TO VERIFY LOCATION OF ANY EXISTING BURIED SERVICE CONDUITS.
21. DOCUMENT GROUND RING INSTALLATION AND CONNECTIONS TO IT WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PRESENT PHOTO ARCHIVE A SITE "PUNCH LIST" WALK TO SPRINT'S REPRESENTATIVE.

NOTE:
INFINIGY ENGINEERING HAS NOT CONDUCTED AN ELECTRICAL LOAD STUDY FOR THIS SITE. CONTRACTOR IS TO VERIFY EXISTING ELECTRICAL LOADS PRIOR TO CONSTRUCTION TO ENSURE THERE IS AMPLE SERVICE AVAILABLE TO ACCOMMODATE THE EXISTING AND PROPOSED EQUIPMENT.

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

NOTES:

CONTRACTOR TO USE EXISTING SPARE CONDUITS, IF AVAILABLE. CONDUIT SIZES MUST BE EQUAL TO OR GREATER THAN THAT ALLOWED BY CODE.

EXISTING ALARMS NEED TO BE RE-ROUTED AND VERIFIED IN PROPER WORKING CONDITION WHEN NEW MMBTS EQUIPMENT IS INSTALLED.

REMAINING GROUND LEADS FROM REMOVED CABINETS TO BE COILED (NOT ON WALKING SURFACE).

REMAINING UNUSED CONDUITS FROM EXISTING CABINETS TO BE COVERED WITH WATERPROOF CAPS (NOT DUCT TAPE).

EXISTING PANELBOARD

PANEL RATING: 120/240V, 60 HZ, 1ø, 100A

BUS AMPS		LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD	BUS AMPS	
L1	L2				L1	L2				L1	L2
		NOT LABELED	2	--	1	7	--	2	NOT LABELED		
					2	8					
		CLEARWIRE	2	--	3	9	--	2	NOT LABELED		
					4	10					
		NOT LABELED	1	--	5	11	--	1	NOT LABELED		
		NOT LABELED	1	--	6	12	--	--	NOT USED		

NOTE:
CONTRACTOR IS TO ENSURE THE INSTALLATION INSTRUCTIONS FOR EACH CABINET ARE FOLLOWED AND THAT THE MANUFACTURER'S REQUIREMENTS ARE MET.

2 EXISTING PANELBOARD SCHEDULE
NOT TO SCALE

NOTE:
THERE ARE NO EXISTING DUAL POLE BREAKER POSITIONS AVAILABLE FOR THE MM BTS BREAKER. CONTRACTOR TO VERIFY IF THERE ARE EXISTING SPARE OR UNUSED BREAKERS INSIDE THE PANEL AND REPLACE WITH THE NEW 2P 60A BREAKER FOR THE MM BTS CABINET.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
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Fax # (518) 690-0793

No. 24705
LICENSED PROFESSIONAL ENGINEER

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Project Title

HAYDEN STATION
CT03XC065

440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For

Sprint
VISION

Drawing Scale:
AS NOTED

Date:
12/17/12

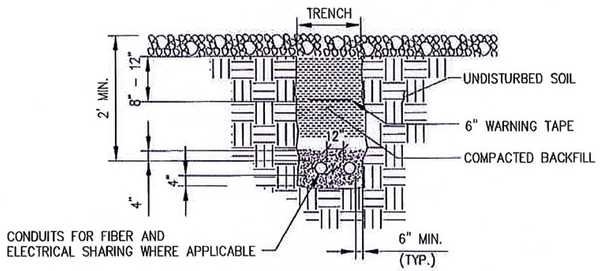
Drawing Title

UTILITY SITE PLAN

Drawing Number

E1

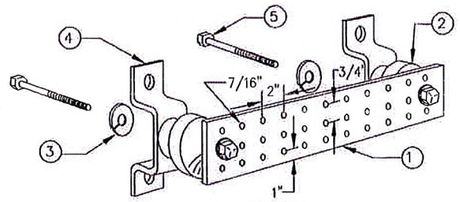
GROUNDING NOTES:
IN ADDITION TO POWER SERVICE GROUNDING AS REQUIRED BY NEC. CONTRACTOR SHALL BE RESPONSIBLE TO COORD AND INSTALL ALL SURGE AND LIGHTING PROTECTION GROUNDING AS REQUIRED AND SPECIFIED BY SPRINT.



– SEPARATION DIMENSIONS MUST BE VERIFIED WITH LOCAL UTILITY CO. REQUIREMENTS.

*HAND DIG INSIDE COMPOUND

1 — NOT TO SCALE
UTILITY TRENCH DETAIL

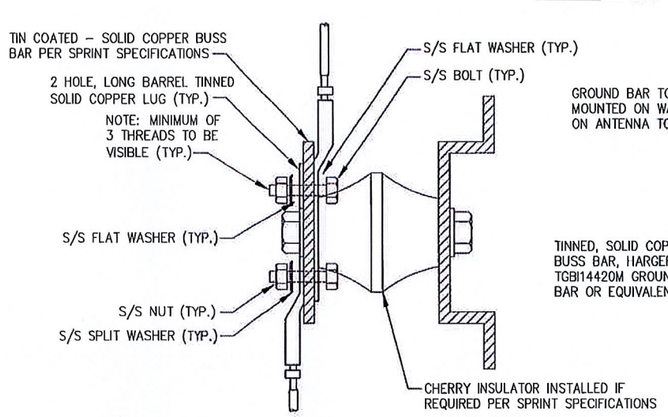


LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO., HARGER TGBI14420M, OR EQUIVALENT. HOLE CENTERS TO MATCH
2. NEMA DOUBLE LUG CONFIGURATION.
3. INSULATORS, NEWTON INSTRUMENT CO. CAT. NO. 3061–4 OR HARGER EQUIVALENT.
4. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8 OR EQUIVALENT.
5. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A–6056 OR HARGER EQUIVALENT.
6. 5/8–11"x1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012–1 OR HARGER EQUIVALENT.

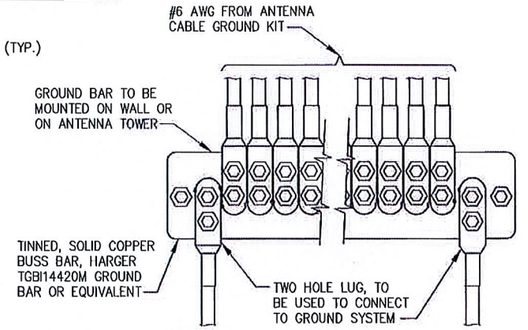
NOTE:
1) ALL MOUNTING HARDWARE CAN ALSO BE USED ON 6", 12", 18", ETC. GROUND BARS.
2) ENTIRE ESSEMBLY AVAILABLE FROM NEWTON INSTRUMENT CO. CAT. NO. 2106060010 OR AS HARGER TGBI14420M.

GROUND BAR



NOTE:
1) ALL HARDWARE 18–8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2) COAT WIRE END WITH ANTI–OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3) APPLY ANTI–OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

GROUND LUG



NOTE:
CONTRACTOR TO UTILIZE KORP–SHIELD (THOMAS & BETTS) OR EQUIVALENT ON ALL LUG CONNECTIONS

ANTENNA GROUND BAR

2 — NOT TO SCALE
GROUND BAR DETAILS

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
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STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24705 — LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND LOCAL LAWS

No	Submittal / Revision	App'd	Date
1	REVISED PER COMMENTS	SKB	12/17/12
0	ISSUED FOR REVIEW	KMF	11/7/12

Drawn: KMF Date: 11/7/12
Designed: AJD Date: 11/7/12
Checked: AGF Date: 11/7/12

Project Number
294-044

Project Title
HAYDEN STATION
CT03XC065
440 HAYDEN STATION ROAD
WINDSOR, CT 06095

Prepared For
Sprint VISION

Drawing Scale: AS NOTED
Date: 12/17/12

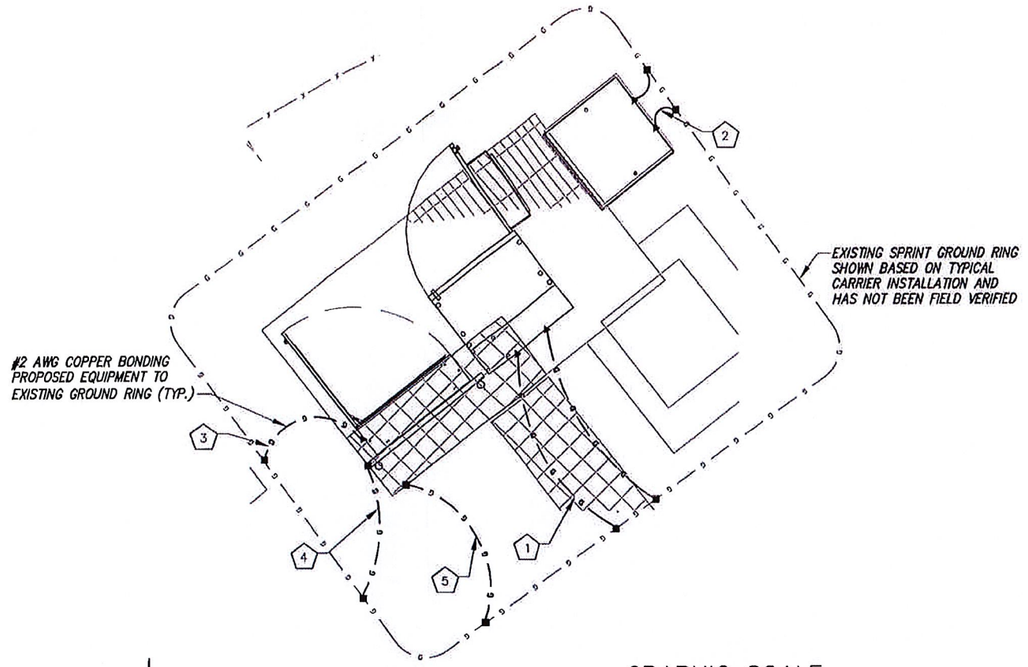
Drawing Title
DETAILS

Drawing Number
E2

CODED NOTES:

1. *PROPOSED MULTIMODAL BTS CABINET*
2. *PROPOSED BATTERY BACKUP CABINET*
3. *PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO NEW H-FRAME*
4. *PROPOSED H-FRAME FURNISHED AND INSTALLED BY CONTRACTOR*
5. *PROPOSED ICE BRIDGE EXTENSION FURNISHED AND INSTALLED BY CONTRACTOR*

SYMBOL	
⊗	COPPER GROUND ROD
▸	CONNECT PER MANUFACTURER SPECS
■	CADWELD CONNECTION
•	MECHANICAL CONNECTION
▬	GROUND BAR



CALLED NORTH

1 — EQUIPMENT GROUNDING PLAN
SCALE: AS NOTED

GRAPHIC SCALE

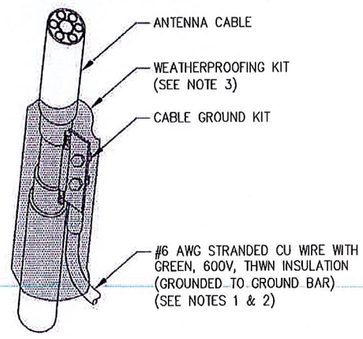
4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

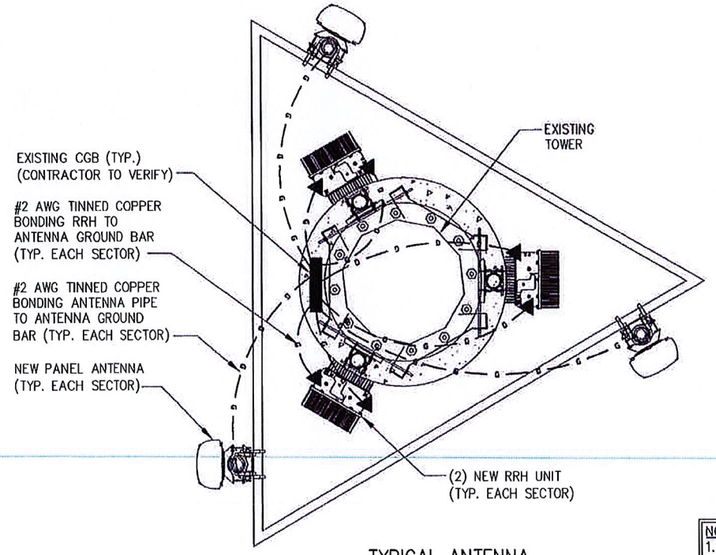
GROUNDING NOTES:

1. ALL DOWN CONDUCTORS AND GROUND RING AND CONDUCTOR SHALL BE #2 AWG, SOLID, BARE, TINNED COPPER, UNO. ALL CONNECTIONS TO GROUND RING SHALL BE EXOTHERMICALLY WELDED. CONDUCTOR SHALL BE A MINIMUM DEPTH BELOW GRADE OF 30 INCHES OR TO THE LEDGE. MINIMUM BEND RADIUS SHALL BE 8 INCHES. CONDUCTOR SHALL BE AT LEAST 24 INCHES FROM ANY FOUNDATION, UNO.
2. WHERE MECHANICAL CONDUCTOR CONNECTIONS ARE SPECIFIED, BOLTED, COMPRESSION-TYPE CLAMPS OR SPLIT-BOLT TYPE CONNECTORS SHALL BE USED.
3. GRIND OFF GALVANIZING IN AFFECTED AREA. EXOTHERMICALLY WELD #2 CONDUCTOR AT 6 INCHES ABOVE GRADE R FOUNDATION, WHICHEVER IS HIGHER. COLD-GALV AFTER. EXOTHERMICALLY WELD OTHER END TO THE GROUND.
4. GROUND CONDUCTORS ON EXTERIOR WALL OF SHELTER SHALL BE ENCASED IN PVC CONDUIT TO GRADE. MOUNT PVC WITH GALVANIZED "C" CLAMPS. SEAL TOP ENDS.
5. FOLLOWING COMPLETION OF WORK, CONDUCT GROUND TEST. SUBMIT WRITTEN TEST TO CONSTRUCTION MANAGER AND PROJECT MANAGER.
6. ALL GROUNDING WORK SHALL COMPLY WITH CARRIER(S) STANDARDS.
7. GROUNDING REQUIREMENTS SHOWN ON THIS PLAN ARE FOR ITEMS THAT ARE LOCATED NEAR GRADE LEVEL AND THAT NEED TO BE TIED TO THE BELOW GRADE GROUND RING.
8. UNLESS NOTED OTHERWISE, ALL GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT'S SSEQ DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES", AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING". ALL GROUNDING SHALL ALSO COMPLY WITH ALL STATE AND LOCAL CODES, AND THE NATIONAL ELECTRICAL CODE (NEC).
9. UNLESS NOTED OTHERWISE, ALL GROUNDING CONNECTIONS SHALL BE MADE BY AN EXOTHERMIC WELD.
10. RESISTANCE TO EARTH TESTING IS REQUIRED PER SPRINT STANDARDS ON ALL NEW SITES.
11. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUND RING.

NOTES:
1) DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2) GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3) WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.



2 — CONNECTION OF GROUND KIT TO ANTENNA CABLE
NOT TO SCALE



3 — TYPICAL ANTENNA GROUNDING PLAN
NOT TO SCALE

NOTES:
1. CONTRACTOR TO VERIFY EXISTING LUG SPACES ARE AVAILABLE ON GROUND BAR. ADD ADDITIONAL BUS BAR IF NO LUG SPACES ARE AVAILABLE.
2. ANTENNA GROUNDING CONNECTIONS SHOWN ARE NOT EXACT TO THIS SITE. FOR EXACT ANTENNA LAYOUT REFER TO ANTENNA CONFIGURATION SHEET.

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GROUNDING PLAN AND DETAILS

Drawing Number:

E3